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**A RETROSPECTIVE STUDY OF THE INCIDENCE OF MISSED
OPPORTUNITIES IN IDENTIFYING, MANAGING AND REFERRING
AT-RISK OF OVERWEIGHT AND OVERWEIGHT CHILDREN AND
ADOLESCENTS IN AN OUTPATIENT PRIMARY CARE SETTING**

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

By

AMY S. QUIRKE, Capt, USAF, NC

2004

Wright State University

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**THE VIEWS EXPRESSED IN THIS ARTICLE ARE
THOSE OF THE AUTHOR AND DO NOT REFLECT
THE OFFICIAL POLICY OR POSITION OF THE
UNITED STATES AIR FORCE, DEPARTMENT OF
DEFENSE, OR THE U.S. GOVERNMENT.**

ABSTRACT

Quirke, Amy S. M.S., Wright State University-Miami Valley College of Nursing and Health, Wright State University, 2004. A Retrospective Study of the Incidence of Missed Opportunities in Identifying, Managing and Referring At-Risk of Overweight and Overweight Children and Adolescents in an Outpatient Primary Care Setting.

A descriptive study of the incidence of missed opportunities in identifying, managing and referring children and adolescents at-risk of overweight and overweight were conducted using a retrospective chart review of two Midwest, suburban, private outpatient primary care clinics. Of the 208 medical records reviewed, the incidence of at-risk of overweight (BMI-for-age $\leq 85\% < 95\%$) in children and adolescents was 8.8% and 9.4%, respectively. The overweight (BMI-for-age $\geq 95\%$) prevalence rate for each group was 14.7% and 17.9%, respectively. None of the 19 children or adolescents with a calculated BMI-for-age as at-risk for overweight was identified by the HCP with an ICD 9-CM code for obesity or abnormal weight gain in the medical record. Of the 34 subjects with a calculated BMI-for-age as overweight, 40% of children ($n = 6$) and 42% of adolescents ($n = 8$) were identified by the HCP as overweight as evidenced by a diagnosis of obesity or abnormal weight in the medical record.

None of the children or adolescents at-risk of overweight received a referral for nutrition or psychological counseling or specialty care. Twenty-three of the 53 children and adolescents identified as being at-risk of overweight or overweight also had a chronic medical condition. Of these 23, only two children with Reactive Airway Disease were given referrals to nutritional medicine.

These findings indicate that children and adolescents are not being identified in the primary care setting as at-risk of overweight, nor are they receiving management, intervention or referral for specialty care. Additionally, individuals who are overweight are not being consistently identified, managed or treated.

ABSTRACT

Quirke, Amy S. M.S. , Wright State University-Miami Valley College of Nursing and Health, Wright State University, 2004. A Retrospective Study of the Incidence of Missed Opportunities in Identifying, Managing and Referring At-risk of Overweight and Overweight Children and Adolescents in an Outpatient Primary Care Setting.

The incidence of adult obesity has nearly doubled over the past two decades in the United States (Office of the Surgeon General [SG], 2001). Current levels of obesity in children and adolescents has been estimated at 15.4 % and 15.9%, respectively according to the National Health and Nutrition Examination Survey (NHANES) 1999-2000.

Researchers have shown that several chronic illnesses seen in adults are related to the health behaviors learned and socialized during childhood (Chen, Srinivasan, Bao and Berenson, 2001; Freedman, Khan, Dietz, Srinivasan and Berenson, 2001). Therefore, research into the identification, management and referral practices of health care professionals in the primary care setting was warranted to examine the amount of preventive care offered at this level.

A retrospective study of the incidence of missed opportunities in identifying, managing and referring children and adolescents at-risk of overweight and overweight was conducted via chart review of two, Midwestern, suburban, private outpatient primary care clinics. The conceptual model used for this study was based on Frankenburg's (1974) concepts of an effective screening program for disease. A data collection tool,

developed by the principal researcher was used to provide demographics on the population at-risk to include sex, age, height, weight, and body mass index (BMI). The stratified randomized sample included medical chart reviews of 102 children and 106 adolescents from the combined clinic locations.

The incidence of at-risk of overweight (BMI-for-age $\leq 85\% < 95\%$) in children and adolescents was 8.8% and 9.4%, respectively. The overweight (BMI-for-age $\geq 95\%$) prevalence rate for each group was 14.7% and 17.9%, respectively. None of the 19 children or adolescents with a calculated BMI-for-age as at-risk for overweight was identified by the HCP with an ICD 9-CM code for obesity or abnormal weight gain in the medical record. Of the 34 subjects with a calculated BMI-for-age as overweight, 40% of children ($n = 6$) and 42% of adolescents ($n = 8$) were identified by the HCP as overweight as evidenced by a diagnosis of obesity or abnormal weight in the medical record. Overweight adolescents ($n = 12$, 63.2%) were more likely than overweight children ($n = 5$, 33.3%) to receive some form of intervention during their primary care office visit.

None of the children or adolescents at-risk of overweight with or without a chronic medical condition received a referral for nutrition or psychological counseling or specialty care. The referral rate for both overweight children ($n = 2$) and overweight adolescents ($n = 1$) was 13.3% and 5.3%, respectively.

Twenty-three of the 53 children and adolescents identified as being at-risk of overweight or overweight also had a chronic medical condition. Of these 23, only two children with Reactive Airway Disease were given referrals to nutritional medicine. Final comparison using a multi-level Chi-squared test of independence between referrals

generated for those at-risk of overweight or overweight with chronic medical conditions and those diagnosed as at-risk of overweight without chronic medical conditions was not significant ($p = 0.199$).

These findings indicate that children and adolescents are not being identified in the primary care setting as at-risk of overweight, nor are they receiving management, intervention or referral for specialty care. Additionally, individuals who are overweight are not being consistently identified, managed or treated. Finally the BMI is not routinely calculated and charted on the appropriate chart.

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“What lies behind us is nothing compared to what lies within us and ahead of us.”

-Anonymous

I. INTRODUCTION

The prevalence of overweight among children and adolescents in the United States has been on the rise since the mid 1970s (CDC, 2003b). Between the 1960s and 1994, the prevalence of overweight among the 6- through 11-year-old children increased from 4% to 11%. Overweight increased from 5% to 11% in 12- through 19-year olds during the same period. The latest examination data from the 1999-2000 National Health and Nutrition Examination Survey (NHANES) calculates the percentage of overweight in these age groups to be 15.5% among 12- through 19-year-olds and 15.3% among 6- through 11-year-olds (Ogden, Flegal, Carroll & Johnson, 2002). If the prevalence trend in overweight continues at this rate, by 2020, 25% of all children and adolescents will be overweight.

Direct and indirect medical costs attributed to both overweight and obesity in adults accounted for 9.1% (\$78.5 billion) of total U.S. medical expenditures in 1998 (Finkelstein, Fiebelkorn, & Wang, 2004). Medical expenditures for overweight children and adolescents are not yet available. Researchers have previously reported several health outcomes associated with overweight and obesity in adults which include heart disease, hypertension, dyslipidemia, chronic inflammation, increased blood-clotting tendency, gall bladder disease, and type 2 diabetes (Chen, Srinivasan, Bao and Berenson, 2001; Freedman, Khan, Dietz, Srinivasan and Berenson, 2001; Gunnell, Frankel, Nanchahal, Peters, & Smith, 1998). Certain risk factors leading to obesity in adulthood occur in early childhood and adolescence. High fat diets, lack of exercise, and sedentary

behaviors are some of the risk factors that take root early in childhood and are acquired through socialization in the family and in communities (Metz, Lindquist, Birch, Fisher, & Goran, 2002; Salbe, Weyer, Lindsay, Ravussin & Tataranni, 2002). It is not clear whether health care practices appropriately identify, manage and refer at-risk of overweight and overweight children and adolescents to specialty services. Studies completed to date have surveyed HCPs on their identification, management and treatment practices. However, there have not been any medical record reviews to investigate the consistency of these practices. Therefore, exploring the incidence of missed opportunities for identifying and referring at-risk of overweight and overweight children and adolescents for additional counseling may provide insight on how to improve health care services for this population. The focus of this study was to examine the identification, management and referral practices of at-risk of overweight and overweight children and adolescents by HCPs.

Statement of the Problem

The incidence of overweight in today's youth has more than doubled since the early 1970s (CDC 2003b) and is among one of the most prevalent health problems in the United States and other developed countries (Office of the Surgeon General, 2001; Troiani & Flegal, 1998). Researchers have focused on the demographics, environmental determinants, sociocultural, as well as psychological aspects of obesity; but there has not been any research that has reviewed medical records for the pattern of identification, management and referral of at-risk of overweight and overweight children and adolescents in the outpatient primary care setting (Gonzales, Marshall, Heimendinger,

Crane & Neal 2002; Metz, Lindquist, Fisher & Goran, 2002; Tershakovec, Kuppler, Zemel & Stallings, 2002).

Significance and Justification

Current data from the Centers for Disease Control, National Health and Nutrition Examination Survey (Ogden, Flegal, Carroll & Johnson, 2002) indicates that the incidence of overweight in children ages 6-19 years is 15 %. This is up four percent from the previous survey done in 1998. Furthermore, the prevalence of overweight for adolescents has almost tripled in the past two decades (Office of the Surgeon General, 2001). Childhood obesity has short and long term consequences as well as physical and psychological effects on the individual (Myers & Vargas, 2000). Moderate to severe obesity can increase risk of hyperlipidemia, hypertension, early puberty and menarche, obstructive apnea, gall bladder disease, polycystic ovary syndrome and low self-esteem (Freedman, Khan, Dietz, Srinivasan, & Berenson, 2001; Gunnell, Frankel, Nanchahal, Peters, & Smith, 1998; Legler & Rose, 1998; Chen, Srinivasan, Bao, & Berenson, 2001). The American Academy of Pediatrics (2003) recommends that eating and activity patterns be assessed routinely. Additionally, excessive weight gain relative to growth and development should be addressed with parents and referrals made to specialty care as warranted.

Researchers completed a prevalence trend analysis of children and adolescents ages 6-19 years using the National Health and Nutrition Examination Survey (NHANES) III from 1988-1994 and the NHANES II conducted in 1976-1980. They found that the prevalence of overweight in this data set corresponded with the longitudinal data retrieved from the Bogalusa Heart Study as well as baseline data from the National Heart

and Lung, and Blood Institute's Growth and Health Study (Troiano & Flegal, 1998). In short, obesity and overweight increased at alarming rates and had nearly doubled in the past two decades. Upon further statistical analysis, researchers showed that not only were more children and adolescents overweight, but that those already overweight were getting heavier when comparing the NHANES III data to older versions of the survey, National Health Examination Survey (NHES) II and III completed in 1963-1965 and 1966-1970 respectively. These comparisons showed that results were not associated with racial-ethnic composition or due to increases in stature, but were multifactorial in nature.

The consequences of being overweight as a child and in young adulthood produces long-term detriments to health and well-being as an adult, namely hypertension, dyslipidemia, chronic inflammation, increased blood clotting tendency, gall bladder disease, type 2 diabetes, and obesity (Ebbeling, Pawlak, & Ludwig, 2002). The medical community is aware of the increased risk of overweight in certain populations such as those of African American or Native American descent, those of lower socioeconomic class, and children with overweight parents who may have a predisposed genetic and environmental influence on their risk of becoming overweight (Salbe, Weyer, Lindsay, Ravussin & Tataranni, 2002; Tershakovec, Kuppler, Zemel, & Stallings; 2002; Young, Dean, Flett, & Steiman, 2000). Health care professionals are also aware of the role that sedentary behaviors, lack of physical activity, and poor nutrition in schools and homes play in the onset of at-risk of overweight and overweight in our youth (Lindquist, Reynolds, & Goran, 1999; Salbe, Weyer, Lindsay, Ravussin & Tataranni, 2002). Additional studies indicate that being at-risk of overweight and overweight in children and adolescents is generally multi-causal in nature and often due to lack of physical

activity, poor eating habits, genetics and psychological and sociological factors (Epstein, Paluch, Gordy, Constance, & Dorn, 2000; Schumann, Nichols & Livingston, 2002; Office of the Surgeon General, 2001).

Researchers have examined the attitudes, beliefs and practices regarding identification, management and treatment of overweight children and adolescents by surveying health care providers (Barlow & Dietz, 1998; Jonides, Buschbacher & Barlow, 2002). Investigating these areas is important in understanding differences in interventions. Little is known, however, about the incidence of missed opportunities in identifying, managing and referring at-risk of overweight and overweight children and adolescents for specialty care. Because there was no studies found that had completed a retrospective medical record review, this study was justified because the researcher proposed to examine the incidence of correctly identifying, managing and referring children and adolescents at-risk of overweight and overweight in the primary care setting by health care professionals.

Statement of Purpose

The purpose of this study was to determine the incidence of missed opportunities for identifying, managing and referring at-risk of overweight and overweight children and adolescents for nutritional, psychological or other forms of counseling in two separate Midwestern, suburban outpatient primary care clinics.

Research Questions

This study was designed to respond to the following questions:

1. What is the incidence of children and adolescents who are at-risk of overweight or overweight in the outpatient primary care clinic?

2. What is the incidence of children and adolescents identified by the health care professional (HCP) as at-risk of overweight or overweight in the outpatient primary care clinic?
3. What is the incidence of HCP office visit interventions for children and adolescents at-risk of overweight or overweight in the outpatient primary care clinic?
4. What is the incidence of referrals to community physical activity programs, or nutrition, psychological or specialty care counseling, of those children and adolescents at-risk of overweight or overweight?
5. What is the incidence of children and adolescents at-risk of overweight or overweight with a chronic medical condition who are referred to community physical activity programs, or nutrition, psychological or specialty care counseling?
6. What is the difference between the referral rate of those children and adolescents with an existing chronic medical condition who were at-risk of overweight or overweight and the referral rate of those at-risk of overweight or overweight without an existing chronic medical condition in the outpatient primary care clinic?

Definition of Terms

In the research questions, several variables were identified. The variables include at-risk of overweight, overweight, children, adolescents, missed opportunities, correct identification, professional office visit intervention, referral, physical activity programs, nutritional and psychological counseling, specialty care, chronic medical conditions, HCPs, and outpatient primary care clinics. These concepts were defined conceptually and operationally as the terms apply to the study for at-risk of overweight and overweight children and adolescents.

At-risk of Overweight

At-risk of overweight was described conceptually by the Centers for Disease Control and Prevention (2003a) as a BMI-for-age equal to or above the 85th percentile to less than the 95th percentile according to the weight for height measurement, gender and age.

Operationally, at-risk of overweight was defined as a BMI-for-age equal to or above the 85th percentile to less than the 95th percentile according to the weight for height measurement, gender and age. BMI was calculated by the researcher on every medical record reviewed from the most recent weight and height measurement using the formula provided on the growth/weight charts from the CDC (2003a): $\text{weight (kg)/stature (cm)}^2 \times 10,000$.

Overweight

Conceptually, overweight is defined as a BMI-for-age equal to or above the 95th percentile in relation to the individual's weight for height, gender and age (CDC 2003a).

For the purposes of this study, overweight was operationally defined as a BMI-for-age $\geq 95^{\text{th}}$ percentile according to the weight for height measurement, gender and age (CDC 2003a). BMI was calculated by the researcher on every medical record reviewed from the most recent weight and height measurement using the formula provided on the growth/weight charts from the CDC (2003a): $\text{weight (kg)/stature (cm)}^2 \times 10,000$.

Children

Conceptually, children were defined based upon their psychological, physical and chronological age development. According to Erikson (1963), children ages 6-11 years were categorized as school-age children. Developmental tasks accomplished at this stage

are learning by exploring, collecting and producing things. Puberty for the majority of children has not occurred.

For the purposes of this study, children were defined as those age 6-11 years.

Adolescents

Conceptually, the age span for adolescents is 12-20 years (Erickson, 1963). In females the first visible sign of puberty is the appearance of breast buds around 10 years of age. Menses often begin 2-2.5 years later at around 12-13 years of age (Behrman, Kliegman & Jenson, 2004). Pubertal change in males begins as early as 9.5 years with testicular enlargement. Spermatarche is attained at around 14 years of age. Psychological developments include a sense of identity, which includes a sense of separation from family of origin, initiation of intimacy and selecting a vocation (Erickson, 1963).

Operationally, as it relates to this study, adolescents were defined as those age 12-19 years.

Missed Opportunities

Conceptually, missed opportunities as they relate to health care and this study were defined as those incidences in which, if appropriate action to an illness or disease had been initiated by a HCP, the potential effects of disease or illness could be relieved, diminished or prevented (Lessler, 1972).

Operationally, missed opportunities were defined as any visit to the child's or adolescent's HCP in which the child was at-risk of overweight or overweight but did not receive any interventions, a referral for community physical activity programs, or nutritional, psychological or specialty care counseling.

Identification

Conceptually, identification relates to accurate classification of an entry or an attempt to establish or verify a particular item as being the same or identical (Mullins, 1986).

For the purposes of this study, correct identification was defined operationally as an accurate BMI $\geq 85^{\text{th}}$ percentile to $< 95^{\text{th}}$ percentile for at-risk of overweight or $\geq 95^{\text{th}}$ percentile for overweight as verified by the researcher using the most recent recorded height and weight measurement in the medical record or the recording in the medical record of a diagnosis or documentation of an International Classification of Disease, 9th Revision Clinical Modification (ICD9-CM)) for at-risk of overweight or overweight by a HCP (Hart, & Hopkins, 2003).

Professional Office Visit Intervention

Conceptually, an intervention as it relates medically is a planned action on the HCP's part to enhance or assist a client or patient in attaining planned and mutually agreed upon goals (Kozier & Erb, 1987).

For the purposes of this study, intervention included actions taken by the HCP to assist the patient correctly identified as at-risk of overweight or overweight. These interventions included: discussing the importance of proper nutrition using the U.S. Department of Agriculture food guide pyramid; analyzing a 24-hour dietary recall; discussing the need for increasing physical activity such as biking, walking, team sports, swimming, jogging, dance or aerobics, or decreasing sedentary behaviors such as playing video games and watching television. Other interventions included providing educational material regarding diet and exercise in the form of pamphlets, booklets, videos or visual

demonstrations, or referring the individual to community physical activity programs, nutritional or psychological counseling or specialty care. These interventions had to be documented in the medical record as part of the patient visit.

Referral

Conceptually, a referral is a process whereby a patient or the patient's family is introduced to additional health resources in the community or health care system (Mullins, 1986).

Operationally, for the purposes of this study, a referral relates to documentation in the medical record of any intervention taken by the HCP to recommend a community physical activity program, or to obtain a specific type of counseling or advising regarding nutrition, psychology or specialty care such as endocrinology, neurology, cardiovascular, rheumatology, immunology, or pulmonary.

Physical Activity Programs

Physical activity programs are courses pertaining to motion or action in sports or exercises (Mullins, 1986).

For the purposes of this study, physical activity programs were defined operationally as those structured courses within a community that offer activities in a wide variety of sports or exercises. Examples of community physical activity programs include team sports such as soccer, volleyball, basketball, baseball, or softball and individual sports such as swimming, dance or aerobics classes, biking, hiking, jogging offered through local organizations clubs.

Nutritional Counseling

Nutrition involves the consumption of foods by which a living organism assimilates food and uses it for growth and for replacement of tissues (Stein, 1980).

Counseling is an attempt to improve an individual's performance through active coaching and advising and reflection (Marquis & Huston, 2003). Therefore, nutritional counseling is an attempt to improve an individual's consumption of foods through active coaching and counseling.

For the purposes of this study, nutritional counseling was defined as an attempt by the HCP to improve the individual's diet using the food guide pyramid as documented on the medical record. A referral to a registered dietician, one who studies, is licensed and applies the principles of science and nutrition to improve an individual's consumption of foods through active coaching and counseling, was needed when attempts at nutritional counseling by the primary HCP had failed or were deemed necessary as documented in the medical record (Mullins, 1986).

Psychological Counseling

Psychology is a profession that involves the application of knowledge, skills and techniques in an attempt to understand, prevent or find solutions to individual or social problems, in regards to interactions between the individual and the physical and social environment (Mullins, 1986).

Psychological counseling as it relates to this study was defined as an attempt by a HCP or specialist in the field of psychology to encourage patients to express their problems and conflicts, and to experiment with new ways of handling problems and conflicts (Johnson, 1989). Documentation in the medical record by the HCP was used to

verify whether attempts at psychological counseling had failed or if a referral to a psychologist was needed.

Specialty Care

Conceptually, specialty care is an aspect of medicine to which physicians narrow their practice after certification of special knowledge by examination (Mullins, 1986).

Specialty care for the purposes of this study refers to any medical services provided by a specialist such as an endocrinologist, cardiologist, neurologist, rheumatologist, immunologist, or pulmonologist as documented by referral in the medical record (Barlow & Dietz, 1998).

Chronic Medical Conditions

A chronic medical condition is an illness or disease affecting an individual's state of physical, emotional or mental health and well-being that develops slowly over time or persists for a long period of time to include the lifetime of the individual (Mullins, 1986).

Chronic medical conditions, as they relate to this study, included any diagnosed congenital, physical, emotional or mental health illness or disease affecting an individual's weight, physical activity tolerance or energy metabolism either through intrinsic or extrinsic pathways. Illnesses of this nature include Prader-Willi Syndrome, Down Syndrome, Laurence-Moon Syndrome, excess production of cortisol (Cushing's syndrome), thalamic or pituitary disorders, hypothyroidism, type 1 and 2 diabetes, obstructed sleep apnea, depression, anxiety, obsessive-compulsive disorders, attention-deficit/hyperactivity disorders, asthma/reactive airway disease, pregnancy, and neuromuscular, musculoskeletal or cardiovascular disorders (Forrest, et al., 1999; Legler & Rose, 1998; McCance & Huether, 2002).

Health Care Professionals

Health care professionals are individuals who completed a course of study in a field of health, such as a registered nurse, psychologist, registered dietitian, physician, nurse practitioner, or physician assistant who hold a license by a government agency, a certificate by a professional organization or both (Mullins, 1986).

Health care professionals are physicians, nurse practitioners or physician assistants as indicated in the medical record (Foster, Hunsberger & Anderson, 1989).

Outpatient Primary Care Clinic

Outpatient primary care clinic is a department or area outside or away from a hospital where persons may receive medical care and treatment during the first contact in a given episode of illness that leads to a decision regarding a course of action to resolve the health problem by a HCP (Mullins, 1986).

For the purposes of this study, outpatient primary care clinic is operationally defined as a non-hospital based, free standing treatment center, department or area of medical services that was able to address health maintenance, disease/illness prevention, coordinating multispecialty and multidisciplinary treatment regimens and care of primary complaints such as colds, fevers, earaches, coughs, rashes and minor injuries (Green, Singleton & Aronzon, 2001). Individuals were seen and treated by a HCP regarding the course of action to resolve the health problem (Forrest, et al., 1999; Healthy People 2010, 2000).

Assumptions

The first assumption was that all health care personnel were correctly annotating the weight and height of each patient and calculating BMI-for-age at least yearly. Lack

of knowledge and insufficient training of technical staff on measurement techniques and use of the new height and weight charts introduced by the CDC (2003a) could lead to errors in documentation and calculation of the BMI-for-age.

A second assumption was that the medical records were a complete and accurate representation of what occurred during a health care encounter.

The last assumption is that the individuals recording the vital statistic data and signing their names are licensed and certified as required for their role.

Limitations

Limitations of this study include aspects inherent in a retrospective design. The researcher assumed that the information gathered from the past represented an accurate account of the patient's visit with their HCP.

Secondly, the data collection method of the chart review was not without limitations. The level of accuracy and amount of thoroughness in the documentation were questionable as was the researcher's interpretation of the patient encounter note.

A third limitation relates to calculating the BMI from the most recent weight for height recorded in the medical record. If HCPs were not accurately recording the weight and height of the client then the BMI calculation would be in error.

A fourth limitation concerned reviewing the most recent visit in the medical record. It is possible that the individual has a history of overweight or eating disorder that was not addressed at the most recent visit with the HCP and therefore may not reflect any current interventions when in fact there were some. In order to decrease the effect of this limitation, any medical record that showed a missed opportunity was reviewed in its

entirety by the principal investigator to determine if any previous interventions were documented.

Finally, due to the limitations in terms of the setting, the findings and conclusions were not generalizable to the population outside midwestern outpatient primary care clinics.

Summary

The purpose of this study was to determine the incidence of missed opportunities for identifying and managing at-risk of overweight and overweight children and adolescents as well as to determine whether those identified in outpatient primary care clinics as being at-risk of overweight or overweight were referred for nutritional, psychological or other forms of counseling. It was well documented in the literature that at-risk of overweight and obesity contribute to a myriad of illnesses and diseases in adults such as coronary artery disease, type 2 diabetes, dyslipidemia, and reproductive cancers (Ebbeling, Pawlak, & Ludwig, 2002). Additionally, the Bogalusa Heart Study, a 30-year longitudinal study that followed children into adulthood, has shown that coronary artery changes begin to occur in children as young as eight years old (Chen, Srinivasan, Bao, & Berenson, 2001). With overwhelming evidence regarding the risk to health caused by at-risk of overweight and overweight, it is imperative that HCPs identify individuals early and intervene as soon as possible.

Assessment of dietary intake and physical activity in children and identification of excessive weight gain relative to growth is crucial throughout childhood and adolescence (American Academy of Pediatrics [AAP], 2003). Any indication of excessive weight gain relative to growth must be addressed with the individual as appropriate for age,

parents, and caregivers, and referrals initiated as indicated. Examining the association between identification and referral of individuals who are at-risk of overweight or overweight will provide data on the prevalence and patterns of referrals generated by HCPs. In other words, are HCPs more inclined to refer individuals who are at-risk of overweight and overweight and who suffer from additional chronic medical conditions than those who are only at-risk of overweight and overweight? According to new recommendations by the AAP (2003), any individual with excessive weight gain relative to linear growth should be assessed for underlying predisposing factors.

This chapter included a presentation of the problem and purpose of the study, the significance and justification for completing the investigation, research questions into this phenomenon, conceptual and operational definitions of the variables, as well as the assumptions and limitations of the study. In the next chapter, a literature review on the trends, assessment, management and treatment of at-risk of overweight and obesity is examined. In addition, a conceptual framework is presented to assist in the identification of at-risk of overweight and overweight children and adolescents and the referral process to specialty care.

II. REVIEW OF LITERATURE

This chapter includes a review of literature related to overweight in terms of its pathophysiology and screening for disease prevention as well as studies regarding the identification, prevention and treatment of overweight. A discussion of the conceptual framework and a schematic diagram of the framework will be provided.

Pathophysiology of At-risk of Overweight and Overweight

At-risk of overweight is defined by the CDC (2003a) as a BMI-for-age $\geq 85^{\text{th}}$ percentile to $< 95^{\text{th}}$ percentile of a child or adolescent's weight to height, and overweight is defined as a BMI-for-age $\geq 95^{\text{th}}$ percentile of a child or adolescent's weight to height. The CDC (2003b) reserves the term obesity to describe adults over the age of 20 years who have a BMI ≥ 30 of weight to height. Obesity is a major concern in the United States because it is associated with the top three leading causes of death: cardiovascular disease, cancer and diabetes mellitus (McCance & Huether, 2002).

In most cases, obesity is caused by a progressive reduction in energy expended versus energy consumed in the form of nutritional intake (Bouchard, 2000). It is usually classified as exogenous, resulting from an excess of ingested calories, or endogenous, resulting from inherent metabolic problems. Physiologically, obesity can be further classified according to the structure and distribution of the adipose tissue itself. For example, becoming overweight in childhood is both hyperplastic, caused by a greater than normal number of fat cells, and hypertrophic, caused by a greater than normal size of fat cells, (McCance & Huether, 2002). In children, the adipose tissue is dispersed over

the entire body and few metabolic abnormalities occur. The same is not true for adults, however. Adult-onset obesity is hypertrophic with the adipose tissue located centrally and metabolic abnormalities are more likely to occur. Increased visceral fat around the abdomen and chest is associated with ischemic heart disease, hyperlipidemia, hypertension and glucose intolerance.

Some researchers suggest that there are sensitive periods when nutritional manipulations may program development of overweight (Bouchard, 2000). In other words, there may be key periods throughout one's life that predispose them to become overweight. Dietz (1994) identified two periods during childhood that are critical for the development of overweight. These include the period between the ages of four and six years and adolescence when adipose tissue is at its peak period for growth. Therefore, these periods of development may be critical for implementing dietary and exercise behaviors as methods of prevention.

Environmental and sociocultural factors have attributed to the increased prevalence of overweight in children and adolescents (Gonzales et al., 2002). Amount of physical activity and sedentary behaviors, poor eating habits, lower socioeconomic class, and ethnicity all play important roles in determining an individual's weight (Office of the Surgeon General, 2001; Salbe, Weyer, Lindsay, Ravussin, & Tataranni, 2002). With the prevalence of overweight in children and adolescents estimated to be about 15 percent in this country, health care professionals are challenged to either treat those individuals currently at-risk of overweight or prevent overweight in those who are lean (CDC, 2003b). Given the limited success of treatment and public health programs aimed at obesity in adults, it may be even more prudent for health care professionals to focus their

attention on identifying and preventing at-risk of overweight and overweight in children and adolescents (Schumann, Nichols & Livingston, 2002).

Screening for Missed Opportunities

Ideally, one would prefer to prevent disease from occurring as opposed to treating its outcomes and effects on a population. Indeed, the medical and lost productivity costs attributed to obesity alone in 1995 were estimated to be \$99 billion dollars (Healthy People, 2010). Obesity is also associated with poor health outcomes. Hypertension, high cholesterol, coronary artery disease, gall bladder disease, arthritis, stroke, certain cancers including reproductive, type 2 diabetes and psychological disorders such as depression are a few (Office of the Surgeon General, 2001). Many of these illnesses and diseases begin their pathophysiological effects early in life. The Bogalusa Heart Study (Freedman, Khan, Dietz, Srinivasan, & Berenson 2002), a 30-year longitudinal study on the effects of obesity have shown that many of the ill effects of poor diet, lifestyle and inactivity in childhood cause increased morbidity and mortality in adults. In the case of identifying and referring at-risk of overweight and overweight children and adolescents, the benefits of taking action far exceed the consequences of no action in terms of cost, morbidity and mortality. Therefore, screening individuals at each primary care visit for at-risk of overweight and overweight can possibly become an extremely important preventive phase.

Screening by health care professionals is an attempt to recognize and treat disease at a time when treatment can either reverse the disease process or slow its rate of progression (Harkness, 1995). However, this definition of screening simply evaluates the presence or absence of disease rather than preventing it. If a screening program is to be

effective for prevention then it must acquire additional information about which characteristics may be significant to the health, education and well-being of the individual.

Doctor William Frankenburg (1974), who developed the Denver Developmental Screening Test, established several key concepts that must be present in selecting an effective screening program for disease. He postulated that the disease or condition should be serious or potentially serious; it should be relatively common or prevalent; it must be possible to differentiate diseased from nondiseased individuals; it must be treatable or controllable; there must be an advantage to early treatment; there must be an adequate interval between the time of screening and treatment for the disease; there must be adequate facilities and resources available to diagnose and treat the disease; and the cost of screening, diagnosis and treatment during the asymptomatic phase must far outweigh the treatment during the symptomatic phase. Many of these concepts are used today as a basis for developing effective screening programs for tuberculosis, diabetes, hypertension, hyperlipidemia, and breast, cervical and colon cancer (CDC 2003c).

The consequence of not instituting a screening program is evident in the measles outbreak of Germany. In 1997, the World Health Organization (WHO) was strategically applying a framework for the elimination of measles in Europe (Siedler, Hermann, Schmitt, & Von Kries, 2002). At that time Germany was categorized into Group 3, poor control and weak surveillance. During an 18-month period, nearly 1500 measles cases, considered to be an epidemic, were reported to the AGM-Sentinel, the measles working group committee. In the summer of 1999, the vaccination status of children < 3 years of age was investigated via a telephone interview in a randomly selected sample of 1400

German households in response to this epidemic. A total of 775 participated in the study for a response rate of 55 percent. For each child present in the home the date of birth, date of vaccine administration and the vaccine used was queried. Researchers found that at age 15 months, only 21.7% of the children had received their first dose of measles vaccine. By 24 months the percentage increased to 77% and by age 36 months 87.6% of children had received their first measles vaccination. The current schedule of vaccination, first immunization given at 15-18 months, would prove to be most harmful for children in the first year of life in this particular area.

From October 1999 to May 2001, a total of 1486 children ages 1-4 years were reported to have measles and to have had the highest number of complications associated with the illness (Siedler, Hermann, Schmitt, & Von Kries, 2002). A high proportion of cases in the first year of life were due to the maternal antibodies rapidly waning and the vaccination schedule set at 15-18 months. The consequence of which resulted in insufficient coverage of vaccination and an outbreak of measles. To combat this problem the WHO set forth age-specific immunity targets as a prerequisite for the elimination of measles. Specific immunity targets were established by age. The rate of susceptible children age 1-4 years should not exceed 15%, children 5-9 years should not exceed 10% and children older than 10 years should not exceed 5 percent. Percentages below these targets put the country at-risk for future epidemics. Therefore, researchers found that by moving the vaccination forward to 11 months of age, the morbidity associated with measles could potentially be prevented in > 50% of the cases found in the second year of life. Through appropriate surveillance data researchers were able to determine the extent of the epidemic and the best course of action for prevention.

Research on Overweight in Children

In reviewing the literature related to at-risk of overweight and overweight in children and adolescents, data supports the definition of at-risk of overweight and overweight in children and adolescents; validity of BMI-for age as a measurement of overweight in children; epidemiology and trends of overweight; psychological, emotional and behavioral assessment of the overweight child and adolescent, and management and treatment of overweight. However, only limited research regarding the identification and referral of this population at-risk was found. Studies on the management and treatment of children and adolescents who are overweight based on reports from pediatricians, pediatric nurse practitioners and registered dietitians are in the literature but no research was found that focused on data collected through medical record review.

The effects of at-risk of overweight and overweight are well documented in the literature. One of the longest and most detailed studies of children known to date is the Bogalusa Heart Study. In 1972, the National Institutes of Health sponsored Specialized Centers of Research at Louisiana State University Medical Center to examine risk factors associated with cardiovascular etiologies and diseases. The Bogalusa Heart Study has been conducting cardiovascular risk factor research both in the community and in the laboratory for the past 30 years. Perhaps one of the most compelling facts the researchers found in conducting the Bogalusa Heart Study is that some environmental risk factors such as diet, exercise and cigarette smoking are controllable and that lifestyles and behaviors that influence cardiovascular risk are learned and begun early in life (Chen, Srinivasan, Bao, & Berenson, 2001).

Several substudies have been conducted using participants in the Bogalusa Heart Study group. These include substudies on socioeconomic factors, blood pressure, lipid evaluations, genetics, exercise, heart and murmur defects, newborn cohort, diabetes, and pathology. An impressive finding of the study is that the major etiologies of adult heart disease begin in childhood with documented changes occurring by 5-8 years of age. The levels of risk factors in childhood are different than those in the adult years due to growth phases experienced by children during the first year of life, during puberty and in the transition to young adulthood. The findings are quite compelling toward the idea of coronary artery disease beginning in childhood.

Defining and Measuring At-risk of Overweight and Overweight

Body fat mass can be calculated using tricep skin fold, percent body fat, and BMI (Bouchard, 2000; CDC 2003b). The WHO has tentatively recommended the use of the BMI as an indicator for overweight and obesity (WHO, 1998). A subgroup of WHO, International Overweight Task Force (IOTF) is attempting to develop an international BMI standard by age because in children factors of growth and development make definitions more complex. The CDC (2003a) recommends using the BMI-for-age for children and adolescents 2-20 years because BMI-for-age provides a reference for adolescents that can be used beyond puberty; in children and adolescents it compares well to laboratory measures of body fat; and it can be used to track body size throughout life. The reference values for BMI-for-age have been established as underweight < 5th percentile, at-risk of overweight \geq 85th percentile to < 95th percentile, and overweight \geq 95th percentile.

A survey by Guillaume (1999) of 30 countries was conducted to evaluate the methods, the measurements, and the mathematical value assigned to overweight in children. Of the 26 countries that responded, BMI-for-age was found to be the most widely used measurement for overweight in children. However, the methods and mathematical values assigned to overweight were quite different. Many countries in Europe used a BMI-for-age > 90% to define overweight, while Australia used >85th percentile BMI-for-age. Many of the Asian and South American countries, with the exception of Japan, used a weight-for-height ratio of > 120%. In the United States, a child or adolescent is considered at-risk of overweight when their BMI-for-age is \geq 85th percentile to < 95th percentile and overweight when their BMI-for-age is \geq 95th percentile (kg/m^2) (CDC, 2003a).

BMI-For-Age as a Measurement of Overweight in Children and Adolescents

The validity of BMI-for-age as an indicator of the risk and presence of overweight in adolescents in several different ethnic groups was studied by Malina and Katzmarzyk (1999) using 1570 adolescents age 9-19 years representing six different ethnic groups. Triceps skinfold thickness and estimated percentage body fat were used as criteria for adiposity and compared to BMI-for-age. BMI-for-age was found to have high specificity for at-risk of overweight (86.1% - 98.8%) and for presence of overweight (96.3% - 100%) and lower but variable sensitivities for at-risk of overweight (4.3% - 75%) and for presence of overweight (14.3% -60%). All adolescents who were not at-risk for or not overweight were correctly identified. The percent of adolescents who were correctly identified by BMI-for-age as at-risk of overweight or overweight were lacking

consistency (20% - 75%) when compared to triceps skinfold because of its variable sensitivity.

The validity of BMI-for-age was compared with the Rohrer Index (RI) and weight for height in screening for both underweight and overweight in children aged 2-19 years (Mei, Strawn, Pietrobelli, Goulding, Goran & Dietz, 2002). Data from the NHANES III (n = 11096) and pooled data sets from three separate studies in the United States, New Zealand and Italy that used dual-energy x-ray absorptiometry (n = 920) were examined to characterize the sensitivity and specificity of these three indexes in classifying both underweight and overweight. A comparison of the sensitivities and specificities of both BMI-for-age and RI-for-age were strongly correlated with weight for height ($r = 0.99$, 0.97 , and 0.95 for BMI and 0.92 , 0.98 and 0.98 for RI, respectively, for children ages 2-5, 6-11 and 12-19 years). Final analysis showed for each age group BMI-for-age had a higher sensitivity than RI-for-age or weight for height in predicting underweight and overweight. Although anthropometry is one of the most basic and reliable tools for assessing nutritional status, its use is limited to research settings because of its complexity and cost. The authors concluded that the validity of weight for height-based indexes such as BMI-for-age to assess both body fatness and thinness are useful and practical for routine clinical evaluation of body composition. An added advantage to using BMI-for-age over the other two methods of measurement is its ease in application. It allows the weight for height to be measured in the office setting, with ease and low cost.

Recommendations for Management of At-risk of Overweight and Overweight

An Expert Committee organized by The Maternal and Child Health Bureau, Health Resources and Services Administration and the Department of Health and Human Services developed recommendations for physicians, nurse practitioners, and nutritionists, to guide the evaluation and treatment of at-risk of overweight children and adolescents (Barlow & Dietz, 1998). The Expert Committee recommended that children with a BMI-for-age $\geq 85^{\text{th}}$ percentile to $<95^{\text{th}}$ percentile with complications of overweight or with a BMI-for-age $\geq 95^{\text{th}}$ percentile with or without chronic medical conditions must undergo evaluation for possible treatment of overweight.

Additional guidelines from the Expert Committee include treating families and children with sensitivity and compassion and that health care professionals approach the treatment of overweight as a chronic medical condition that can be treated. An area of concern is the approach to medical assessment for exogenous causes of overweight such as genetic syndromes, dysmorphic features and developmental delay, and assessment of secondary complications of overweight such as hypertension and dyslipidemias. Appropriate assessment of these areas is critical to ensure that patients are referred for appropriate specialty care (Barlow & Dietz, 1998). Evaluation for treatment should include readiness to make changes, diet history and amount of physical activity. The Expert Committee reported that the primary goal of a weight reduction program is healthy eating and increasing physical activity, not achievement of ideal body weight. Medical goals should include normal blood pressure and lipid levels for those with secondary complications. Weight goals for children ≥ 2 years of age is maintenance of baseline weight.

Interventions should focus on treatment and behavioral changes of the family (Barlow & Dietz, 1998). Emphasis on increasing activity levels and decreasing caloric intake should be the mainstay of a weight reduction program. Parents and caregivers must be given the education, support and guidance they need to assist the child or adolescent in the health plan. The Expert Committee's report indicated that these areas could easily be fulfilled by limiting television viewing to 1-2 hours per day and using the food guide pyramid as a guide for nutrition with elimination of one to two high calorie foods such as chips and ice cream. Lastly, the Expert Committee recommended that adolescents who use tobacco as a form of weight loss must stop. Although smoking cessation has been shown to cause weight gain of 5-10 pounds, it also increases important risks associated with overweight such as hyperlipidemia and increased central adiposity.

Referring At-risk of Overweight and Overweight Children and Adolescents

Several researchers have conducted studies on the psychological, emotional and behavioral assessment of overweight children and adolescents. In one study, a total of 946 pediatricians, pediatric nurse practitioners and registered dietitians were surveyed using a questionnaire regarding their evaluation, management and treatment of at-risk of overweight children and adolescents (Jonides, Buschbacher & Barlow, 2002). Responses were analyzed to determine adherence to published recommendations and clinical practice guidelines. The study also analyzed associations between referral practices and certain provider characteristics such as gender, BMI, years in practice and specialty.

All groups reported routinely evaluating the psychological and emotional status of patients as well as obtaining a diet history and levels of physical activity (Jonides, Buschbacher & Barlow, 2002). Ninety percent of respondents reported inquiring about

the individual's readiness to change behavior. Eighty percent of all respondents asked patients about being teased for being at-risk of overweight, poor self-esteem, and eating disorders. More than 90% of all providers obtained a diet history. However, there was no consistent method of obtaining the diet history throughout the three groups.

Approximately 95% of all providers questioned individuals about organized physical activities and > 90% asked about leisure time physical activity, free play and sedentary behaviors. Health care professionals who were more likely to adhere to psychological evaluation recommendations were in practice for 10 or more years. The respondents who adhered to recommended practices for diet and physical activity did not differ in gender, BMI, years in practice or specialty.

A small percentage of respondents reported referring patients to mental health programs such as behavior modification (12-24%), family therapy (8%-15%) or group therapy (5%-10%) (Jonides, Buschbacher & Barlow, 2002). Referring patients to other types of specialists (endocrinologists, gastroenterologists, pulmonologists, cardiologists and neurologists) was not routinely reported. No significant relationships were found between health care professional characteristics and adherence to recommendations for mental health and specialty referrals.

Seventy-seven percent of responders reported initiation of treatment in overweight children and adolescents who had no obesity-associated medical conditions (Jonides, Buschbacher & Barlow, 2002). Female pediatricians and PNPs with BMIs < 25 were more likely than male pediatricians and registered dietitians to initiate treatment in this case.

Very few responders (13-29%) initiated treatment for overweight in children and adolescents who did not want to control their weight (Jonides, Buschbacher & Barlow, 2002). Registered dietitians and PNPs in practice longer were least likely to initiate treatment in these cases. However, over two-thirds of all health care professionals surveyed (67%) reported that they did not want to initiate treatment in patients who did not want to control their weight. Researchers reported the most common reason for this is that too few appropriate specialists or programs are available and that many are not covered by insurance. In spite of this, the researchers recommended that professional organizations and agencies address weight control in children and adolescents who are overweight ($\geq 95^{\text{th}}$ percentile) regardless of whether chronic medical conditions exist.

A survey study conducted by Barlow and Dietz (2002) identified the needs of health care professionals as they manage the care of overweight children and adolescents. Respondents of the survey consisted of pediatricians, pediatric nurse practitioners and registered dietitians. The response rate was 33%, which the researchers considered low despite each group receiving two questionnaires and two reminders.

Researchers found the majority of respondents expressed concern about overweight and believed the problem should be treated (Barlow & Dietz, 2002). However, many were reluctant to initiate treatment in the child without existing medical conditions such as asthma or sleep apnea. The respondents cited that the biggest barriers to initiating and being successful with treatment were lack of motivation on the patient's part, lack of time available for counseling, professional self efficacy, the referral process to specialty care, and lack of reimbursement.

Although the researchers noted several limitations, the study was useful in illustrating the need for further investigation into the reported barriers to preventive health care such as lack of reimbursement, not enough time available during clinic visit, inexperience of clinicians in the treatment and management of obesity, and insufficient treatment programs available for patients. The first limitation was an unspecified sample size, which made it difficult to determine the study's strength. Secondly, there was no statistical analysis of the data reported, therefore it is unclear as to what results were significant. Finally, a limitation as noted by the researchers, was that results might be biased in that only those health care professionals most concerned with overweight may have responded. The authors warn the final sample should be considered a convenience sample rather than a representative sample.

Outpatient Primary Care for At-risk of Overweight and Overweight

In a meta-analysis, LeMura and Maziekas (2002) reviewed 30 separate studies regarding exercise and behavior modification as a method for treatment in pediatric overweight. Studies meeting the following criteria were included in the analyses:

- at least six subjects in the group
- subject groups encompassed children age 5-17 years
- pretest and posttest values for either body mass, percent body fat, or fat free mass
- some form of exercise (walking, jogging, stationary bike, high-repetition resistance exercise, and combinations) in treatment plan
- training programs lasting longer than three weeks
- reports were full-length publications
- children were free from disease or disorders that contribute to overweight, and

- published studies in English journals only

Of the 120 articles located and investigated, only 30 met criteria for inclusion. Across all designs and categories, fixed-effects modeling produced significant decreases in the following dependent variables: 1) percent body fat; 2) fat free mass; 3) body mass; 4) BMI-for-age; and 5) Volume of Oxygen (VO_{2max}). Significant differences were found in the types of interventions used in each group. For example: exercise versus exercise and behavioral modification were significant $p < 0.04$; body composition assessment methods which compared skinfold versus hydrostatic weighing and total body water were significant at $p < 0.0006$; exercise intensity of 60-65% of VO_{2max} versus $> 71\%$ of VO_{2max} was significant at $p < 0.01$; duration of exercise less than 30 minutes versus greater than 30 minutes was significant at $p < 0.03$; and aerobic versus aerobic plus resistance training was significant at $p < 0.02$. The most favorable outcomes in body composition were associated with low-intensity, long-duration exercise and aerobic exercise combined with high resistance training. Further findings from this meta-analysis showed behavior modification, family centered life style alterations and exercise resulted in the greatest decreases in percent body fat in children.

Comparable results were seen in a study that examined decreasing sedentary behaviors such as television watching versus increasing physical activity as part of a family-based weight control program in treating pediatric overweight (Epstein et al. 2000). The objective of this study was to compare the differences of outcomes when targeting or increasing physical activity. Researchers used a randomized, controlled outcome study in a childhood overweight research clinic. The sample consisted of 90 families with overweight 8-12 year old children, randomly assigned to groups that

targeted either sedentary behavior or increased physical activity. Both groups were supplied with information on dietary and behavioral change and were followed for two years. Results indicated that positive reinforcement techniques such as praise and contracts were effective in reducing sedentary behavior and increasing physical activity ($p < .0001$). Similar results were observed when physical activity was targeted for evaluation. The researchers found significant decreases in percent overweight of 10.9%; 55% improved aerobic fitness; and 20% increases in physical activity or significant decreases in sedentary time ($p < .05$) at the 2-year follow up.

One of the few longitudinal studies to date was done at the University of Pittsburgh using 185 families spanning 10 years to determine weight loss patterns for overweight children and to identify variables associated with long-term weight reduction and to extend the research to determine the 5-year changes in percentage of overweight (Epstein, Valoski, Wing, & McCurley, 1994). The variables studied were ones manipulated during treatment or were conceptually related to the study such as dietary adherence, energy and nutritional intake, activity levels, and peer, familiar and environmental influences. Assessment of other variables to assist in weight loss was also taken into consideration such as smoking, depression, other weight loss programs, and eating disorders. All study group participants were randomly assigned to each group and to different subgroups within each study group.

Randomly assigned interventions consisted of nutritional education and dietary counseling, diet and lifestyle exercises such as walking; diet alone; or no treatment. The diet alone group was given information on calisthenics and stretching without reinforcement or joint parent and child involvement. The no treatment control group was

followed up after six months and no long-term data on these children are available. The effects of overweight parental weight status on the child's weight status versus non-overweight parents as well as the child's self-control on weight loss were also studied. Outcomes were based on the child and not a joint parent child involvement. Some subjects were randomized into either aerobic exercise, lifestyle exercise or a calisthenics control group.

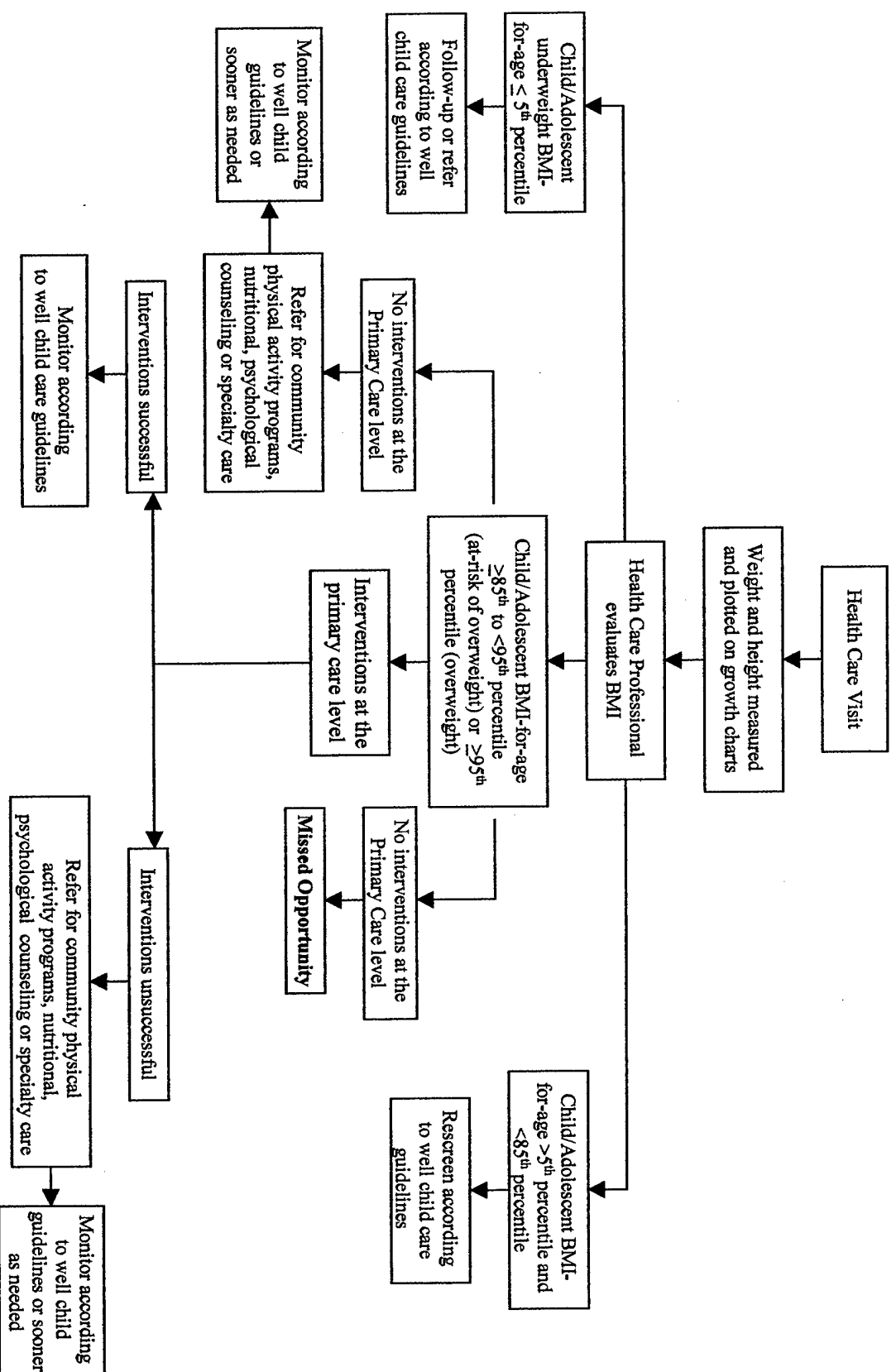
Results obtained from 158 families showed that randomly assigned to treatment groups the parent-child group significantly lost more weight than the control group with no parent involvement at both 5 ($p < .001$) and 10 years ($p = .009$). Large decreases in percentage overweight for individual groups were shown with diet and/or exercise. The researchers concluded that family based behavioral involvement is the best method for weight loss and weight reduction in the child.

Conceptual Framework

The framework for this study is based on the concept of screening as depicted in the theoretical literature presented in this chapter. The conceptual model (Figure 1) indicates that an effective screening program can identify children and adolescents who are at-risk of overweight as indicated by a BMI-for-age $\geq 85^{\text{th}}$ percentile to $< 95^{\text{th}}$ percentile or overweight as indicated as indicated by a BMI-for-age $\geq 95^{\text{th}}$ percentile in weight for height and gender. The establishment of proper identification during routine office visits, well childcare visits or school screenings for at-risk of overweight and overweight would diminish the potential for missed opportunities.

Screening begins with the visit to an outpatient health care professional at which time the patient's weight and height are measured and plotted on the applicable growth-

Figure 1 – Screening Process for Identifying, Managing and Referring At Risk of Overweight and Overweight Children and Adolescents



weight charts and the BMI-for-age growth charts for gender and age. At this time, the health care professional's screening will reveal one of five possibilities: the child or adolescent is underweight and will require follow-up or referral to specialty care (this result is not an objective for this study and will therefore not be evaluated); the child or adolescent is not at-risk of overweight or overweight and nothing further is needed; the child or adolescent is at-risk of overweight or overweight but has not received any form of intervention at the primary care level; the child is at-risk of overweight or overweight and has received some form of intervention at the primary care level; or the child or adolescent is at-risk of overweight or overweight and has been referred to some form of specialty care or counseling. If the child or adolescent is at-risk of overweight or overweight, the health care professional has different choices or paths to follow. One of the possibilities is to do nothing and allow the child to continue to go without intervention and therefore for the purposes of this study, a missed opportunity. Another option is to intervene during the visit and document the interaction and appropriate follow-up in the medical record. Along with the option to intervene with the individual during the health care visit, the health care professional can determine if continued attempts to intervene have failed, and if a referral to specialty care is warranted. Within the framework of this screening process, the researcher examined the missed opportunities for identifying, managing and or referring at-risk of overweight and overweight children and adolescents to community physical activity programs, nutritional or psychological counseling or specialty care.

Summary

A review of the literature demonstrates that there are some consistent findings in regards to definition, measurement, prevalence and incidence of at-risk of overweight and overweight in youth today. The accepted numerical index for at-risk of overweight and overweight is a BMI-for-age $\geq 85^{\text{th}}$ percentile to $< 95^{\text{th}}$ percentile and $\geq 95^{\text{th}}$ percentile, respectively, for weight for height and gender (CDC, 2003a). Malina and Katzmarzyk's (1999) study of the validity of BMI-for-age showed that using BMI-for-age enables the health care professional to screen whether an individual is at-risk of overweight or overweight but it does not determine to what degree an individual is at-risk of overweight or overweight because other factors such as muscle mass are also part of the human stature.

Recommendations from the Expert Committee express the importance of early detection and treatment to prevent the complications associated with childhood obesity (Barlow & Dietz, 1998). Researchers of the Bogalusa Heart Study have reported on the major implications of overweight children and coronary artery disease in adults (Freedman, et al., 2001). With rising health care costs and the increasing need to focus on wellness and health prevention, it is more important for health care professionals to take advantage of every opportunity to identify at-risk of overweight and overweight children and adolescents and refer them to the appropriate level of care as the Expert Committee on overweight recommends.

III. METHODS

The purpose of this study was to determine the incidence of missed opportunities for identifying at-risk of overweight and overweight children and adolescents between the ages of six and nineteen. An additional purpose was to determine the frequency of strategies used to identify those at-risk of overweight or overweight in two separate, Midwestern, suburban outpatient primary care clinics.

This chapter includes a description of the methods used to conduct the study. The items discussed include the research design, the setting, population and sampling plan, procedures, measurements, and data analysis used to conduct the study. In addition to ethical considerations in terms of confidentiality and anonymity to protect the sample, assessment of benefits and risks are also explored.

Research Design

The study was conducted using a retrospective exploratory design which involved a medical record review to identify missed opportunities in managing or referring at-risk of overweight and overweight children and adolescents for nutritional or psychological counseling, community physical activity programs or specialty care service in the outpatient primary care clinic setting. The study was exploratory because of the gap of knowledge in the literature regarding missed opportunities. Previous studies surveyed health care professionals for information regarding treatment and management of at-risk of overweight and overweight children and adolescents (Barlow & Dietz, 2002; Jonides, Buschbacher & Barlow, 2002). There have not been any published studies that reviewed

medical record documentation for information on identifying, managing and referring children and adolescents who were at-risk of overweight or overweight.

The data for the study was collected using a data collection tool designed to record specific items of interest gleaned from the medical record (Appendix A: Data Collection Tool and Code Book). The advantage of using this tool for data collection is that data can be taken directly from the data collection tool and entered into the statistical analysis program, which decreases the potential for transcription error. A limitation of this method is that the medical record is the only source of information used.

Setting

The setting for the study included two private outpatient primary care clinics located in Southwestern Ohio. A total of eight clinics were randomly selected using the yellow pages of the local telephone directory and were contacted about possible participation in this study. Of the eight clinics telephoned, two agreed to participate. Agency permission forms for each clinic are located in Appendix B and C. The medical records examined are housed in each of the outpatient primary care group practice clinics.

Clinic A employs three physicians and one nurse practitioner. It provides health care services to approximately 7,000 children age two weeks to nineteen years of which approximately 3,200 are children and adolescents age 6-19 years. Of the patient population, approximately 85% have private insurance, 12% use federal assistance such as Medicaid, and 3% use point of service payment. Hours of operation are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Monday through Thursday, 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 4:00 p.m. on Friday, and 8:00 a.m. to 12:00 p.m. on Saturday. The number of available appointments per week day is 187 (935 per week) with an additional

24 appointments on Saturday. This equates to 959 appointments per week and approximately 48,000 per year. The clinic is located in a suburb of Southwestern Ohio and services approximately four surrounding counties.

Clinic B employs two physicians and four nurse practitioners, it provides health care services to approximately 7,500 children, age two weeks to nineteen years with approximately 3,760 children and adolescents age 6-19 years. Approximately 82% of the patients seen this in clinic use private insurance, 15% use federal assistance such as Medicaid and approximately 2-3% use point of service payment. Operating hours are 7:00 a.m. to 11:30 a.m. and 12:30 p.m. to 5:30 p.m. Monday through Thursday, 7:00 a.m. to 11:30 a.m. and 12:30 p.m. to 4:00 p.m. on Friday, and 8:00 a.m. to 12:00 p.m. on Saturday. The clinic has 185 appointments per week day (925 per week) with an additional 65 appointments on Saturday. This equates to 990 appointments per week and approximately 50,000 per year. This clinic is also located in a suburb of Southwestern Ohio and services approximately five surrounding counties.

Population

The target population for this study is all children and adolescents age 6-19 years who use either Clinic A or B in southwestern Ohio for their outpatient primary health care. The study sample consisted of 208 randomly selected medical records of children and adolescents age 6-19 years from the two outpatient primary care clinics. The researcher identified children and adolescents at-risk of overweight and overweight by calculating the BMI using the most recent weight and height measurements recorded in the chart and then plotting the result on the appropriate growth chart for gender and age. Because the accessible population was defined as individuals between the ages of 6 and

19 and were located within two, Midwestern Ohio outpatient primary care clinics, the findings are not generalizable beyond the outpatient clinics or region in which the study was conducted.

Sampling Plan

The sample was identified using a stratified random sampling process that included all children age 6 through 19 years who were seen by a health care professional in the outpatient primary care clinics from August 31, 1998 through August 31, 2003 (Burns & Grove, 2001). This study did not stratify any demographic variables. The researcher used a computer-generated list provided by each of the clinics to obtain the sample of all children and adolescents visiting the clinics. The list was then reviewed to delete those children who did not meet the age requirement. From the remaining names, the researcher selected every 31st name from the list using a random beginning point. The exact size of the gap was determined statistically by using the Cohen Power Analysis for multiple regression/correlation analysis (Cohen, 1988). Medical records that did not have a height and weight recorded from a most recent visit were reviewed for the date of the most recent weight and height recorded. The information obtained from that date was used to complete the data on the data collection tool. The total number of medical record reviews needed was calculated to be 88 for children age 6-11 years and 88 for adolescents age 12-19 years for a total of 176 records. This was deemed to allow a level of significance of $p = 0.05$, a power of 0.8 to detect differences in relationships, and a small effect size of 0.3 to determine the extent of the phenomenon (Burns & Grove, 2001). However, to assure that a representative sample was obtained, a total of 100 medical charts for each age group or a total of 200 charts were reviewed.

Ethical Considerations

The rights of human subjects were protected from harm by following established professional and university guidelines for use of research using human subjects. An organizational review by the agencies from which the information was gathered was requested prior to the start of the research project (Appendix B and C: Agency Permission for Conducting the Study). The Wright State University Institutional Review Board (IRB) examined and approved the study prior to its implementation determining that the benefits of the study outweighed the risks and that the subjects are exposed to minimal risk (Appendix D: Wright State University IRB Approval).

Human subjects were not required for this research study. The mechanism for data collection was done via medical record review. This format does not require a cover letter to potential participants or signed consent forms. Health Information Portability and Accountability Act (HIPAA) identifiers such as name, geographic subdivision, any element of dates directly related to an individual, telephone or fax numbers, electronic mail addresses, medical record numbers, social security numbers, health plan beneficiary numbers, account numbers, certificate or license numbers, vehicle identification or serial numbers, Web Universal Resource Locators Internet Protocol address numbers, biometric identifiers such as finger prints, full face photographic or comparable images or any other unique identifier or code were not listed on the data collection tool. The computer generated patient lists used to obtain the sample were not removed from the premises of either clinic location. This study was HIPAA compliant.

Patient information remained confidential throughout the study. The data collection tool was kept in its corresponding location during the data collection process in

the Program Manager's/Nurse Manager's office. Each subject was assigned an identification number by the researcher to be used on the data collection sheets. The identification number began with 001 and progressed consecutively with each medical record reviewed. The same identification number was placed on the computer-generated patient listing opposite the individual's medical record number. This allowed the researcher to retrieve the medical record should any discrepancies in data recording or entry occur. No other identification numbers were used on the collection tool. Upon completion of statistical analysis, the computer-generated patient lists were destroyed according to each corresponding clinic's office procedure allowing the participants to remain anonymous.

The data was entered onto a computer using only floppy disks for storage of information. The hard drive did not contain any information related to the study. The original floppy disks and copies were stored in separate locked locations. The data is presented as group data and no human subjects were contacted or identified in the study.

Procedure

The following steps were taken in order to complete the data collection.

1. Prior to conducting the study, permission was obtained from members of a thesis committee affiliated with the Wright State University--Miami Valley College of Nursing and Health. Committee members have knowledge and expertise in the topic area of the study as well as the research process and procedures. Permission was acquired through Wright State University Institutional Review Board (IRB) of the Office of Research and Sponsored Programs.

2. Following Committee and IRB approval, the data was collected from a review of medical records and recorded on a data collection tool. Data collection from both clinics took approximately three weeks to complete. The data was entered into a computer database program "SPSS" capable of coding and storing all of the required information. The data was then entered twice and reviewed for any discrepancies. Once the information was reviewed for accuracy, the original data sheets were destroyed. The data was then downloaded to floppy disks, with a back-up copy made at this time.

3. The data was compiled and statistical analysis performed.

Measurements

All of the data collection was accomplished using a code-book and data collection tool specifically designed for this study (Appendix A: Data Collection Tool and Code-book). Because the tool's reliability and validity had not been previously tested, a small pilot of the data collection tool was done prior to implementing the study to ensure that correct and usable information was extracted from the medical record reviews. The pilot was also designed to assess inter- and intra-rater reliability of the process in order to determine the extent of random error of the data collection tool (Burns & Grove, 2001).

A master's prepared nurse researcher specializing in pediatrics and the principle investigator assessed inter-rater reliability by collecting data from ten randomly selected medical records using a computer generated list of patients that fit the sampling criteria from a separate clinic location also located in midwestern Ohio. Random selection of records was accomplished by choosing every 31st name from the computer-generated list using a random beginning point. The percentage of like answers by each investigator was calculated for each of the 26 items listed on the code-book to the ten matched pairs

and an overall mean calculated (Burns & Grove, 2001). The number of agreements between raters was divided by the total number of possible agreements. A reliability coefficient of 0.70 is considered the lowest acceptable value for a newly designed instrument for psychometric measurement. For the purposes of this study, a reliability coefficient of 0.80 or 80 percent was considered sufficient for inter-rater reliability. If a reliability coefficient of 0.80 was not obtained, then modifications would be made to the tool based upon the discrepancies noted between raters.

A total of 10 medical records were used for the first pilot test of the tool. Each rater reviewed the same 10 medical records. Documentation within the medical records was used to verify discrepancies between data entry on the data collection tool. The total number of possible agreements was 260. The total number of agreements between raters was 239. This gave a reliability coefficient of 0.92. Although this reliability coefficient was within the requirements for this study, the raters agreed that a "Non applicable" category in the code-book was needed for item numbers 14 – 18, 20 – 24 and 26. This category clarified those entries that do not qualify for a particular item versus those that qualify for a missed opportunity. It was also noted that none of the medical records reviewed for the pilot had the latest CDC (2003a) growth charts. In fact, there were three different growth charts used. Therefore, it was agreed that the primary investigator would calculate and plot the weight, height and BMI of each child and adolescent using only the CDC growth charts to maintain consistency of the data. After the modifications were complete, a pilot study of the tool was re-accomplished using 10 different randomly selected medical records to retest inter-rater reliability. A reliability coefficient of 0.80 was required for the retest. The total number of possible agreements remained at 260.

The total number of agreements between raters was 244. This gave a final reliability coefficient of 0.94.

The principle investigator also assessed intra-rater reliability. After every 50 charts, the principle investigator re-reviewed the first five charts of the set. The data collected was compared to each of the 26 items to determine the degree of congruency for each paired set and a total percentage of like answers were calculated. A reliability coefficient of 0.80 or 80 percent was considered sufficient for intra-rater reliability as well (Burns & Grove, 2001). However, a reliability of 0.70 is considered acceptable for any newly developed psychosocial instrument. If a reliability coefficient of 0.80 or 80 percent was not obtained, then the medical records would not be used. The next five charts would be reviewed within that set for their degree of congruency and reliability coefficient.

The intra-rater reliability testing was carried out four times during the medical record review process. The total number of possible agreements was 130 for each set of five records. The total number of agreements for each set was 116, 117, 119, and 120 respectively. This provided a reliability coefficient of 0.89, 0.90, 0.92 and 0.92, respectively for each set of five records for an average of 90.8 percent.

The validity of a tool is obtained from the review of literature, representatives of the relevant populations and content experts (Burns & Grove, 2001). For the purposes of this study, content-related validity was based upon the review of literature. As described earlier, previous studies had focused on surveying health care professionals on their management and treatment of at-risk of overweight and overweight children and adolescents (Barlow & Dietz, 2002; Jonides, Buschbacher & Barlow, 2002). Specific

information about the practitioner's assessment of psychological and emotional issues related to obesity such as readiness to change, parent's and patient's concern about weight, being teased about weight and family dynamics were among the items surveyed. Practitioners were also queried about how often they initiated treatment in overweight children and adolescents without obesity associated medical problems and how often treatment was initiated in those children and adolescents who did not want to control their weight (Jonides, Buschbacher & Barlow, 2002). In a separate survey study by Barlow and Dietz (2002), researchers found that most health care professionals focused on eating and activity interventions consistent with the Expert Committee recommendations as well as evaluation of family and emotional issues. However, many were reluctant to initiate treatment in overweight children and adolescents without chronic medical conditions.

These two studies provided the basis for the content of the tool design. Modifications were made to the tool based upon the results of the pilot study and a committee review of experts in the fields of nursing, health and education.

Data Analysis

Descriptive statistics were used to organize the data and provide frequency distributions and measures of central tendency including mode, median and mean because previous studies of this nature are not available (Burns & Grove, 2001).

Additional analysis was accomplished using a multi-level Chi-squared test of independence, an inferential statistic, to examine the differences in groups of data. Chi-square is intended to test for differences in frequencies of observed and expected data (Burns & Grove, 2001). If the obtained frequency data are different than the expected frequency data, then one could conclude a difference exists. For purposes of this study,

the difference in frequency data between children and adolescents who are identified as at-risk of overweight or overweight with a chronic medical condition and referred was compared to those children identified as at-risk of overweight or overweight without chronic medical conditions and referred. Most chi-squares are 2 x 2 tables. In this case a 2 x 2 table might compare frequencies of overweight and referral. However, one can intertwine the overweight and referral comparison with another comparison, for example overweight by referral by chronic medical condition. By using this process it is possible to determine which data category has contributed to the significant differences found.

The following list details each research question and the method of analysis conducted.

1. What is the incidence of children and adolescents who are at-risk of overweight or overweight in the outpatient primary care clinic?

The frequency of children and adolescents identified by the researcher calculating the BMI using the most current weight for height recorded in the medical record are reported.

2. What is the incidence of children and adolescents who were diagnosed as at-risk of overweight or overweight in the outpatient primary care clinic?

The frequency of children and adolescents that are either at-risk of overweight or overweight and identified by the health care professional as evidenced by a diagnosis or documentation of an ICD-9-CM code in the medical record was calculated from the total identified as being at-risk of overweight or overweight.

3. What is the incidence of health care professional office visit interventions for children and adolescents as at-risk of overweight and overweight in the outpatient primary care clinic?

The frequency of children and adolescents receiving some form of intervention via education on diet and exercise, pamphlets provided, or review of a 24-hour dietary recall, during the office visit as documented in the medical record was calculated from the sample of those at-risk of overweight or overweight.

4. What is the incidence of referrals to community physical activity programs, or nutrition, psychological or specialty care counseling of those children and adolescents as at-risk of overweight or overweight?

The frequency of children and adolescents referred to community physical activity programs, or nutrition, psychological or specialty care counseling as documented in the medical record was calculated from the sample of those that are at-risk of overweight or overweight.

5. What is the incidence of children and adolescents at-risk of overweight and overweight with a chronic medical condition who are referred to community physical activity programs, or nutrition, psychological or specialty care counseling?

The frequency of children and adolescents at-risk of overweight and overweight with chronic medical conditions who are referred to community physical activity programs, or nutrition, psychological or specialty care counseling as documented in the medical record was calculated from the sample of those that are identified as at-risk of overweight and overweight.

6. What is the difference between the referral rate of those children and adolescents with an existing chronic medical condition who were at-risk of overweight or overweight and the referral rate of those at-risk of overweight and overweight without an existing chronic medical condition in the outpatient primary care clinic?

A multi-level Chi-squared test of independence was used to determine whether the referral rate of children and adolescents who are identified as at-risk of overweight or overweight with a chronic medical condition differs from the referral rate of children identified as at-risk of overweight or overweight without chronic medical conditions as documented in the medical record.

Summary

This chapter included a description of the design, setting, population and the sample of the study. The methods, measurements and data analysis used for the study were also described. Ethical considerations and the procedures to protect the rights of human subjects were discussed.

IV. ANALYSIS OF DATA

This chapter focuses on the analysis of data of this retrospective study of the incidence of missed opportunities in identifying and referring at-risk of overweight and overweight children and adolescents in an outpatient primary care setting. A brief synopsis of the methods used in the study is presented followed by a description of the sample and discussion of the findings for each research question are also provided.

Methods

Archival patient medical records were retrospectively reviewed with the data collected on a tool developed by the researcher. The data analysis was conducted using Statistical Package for Social Sciences (SPSS) for Windows Version 11.0 (2000). Data was analyzed by frequencies and percentages to depict the study's findings related to each research question, then displayed and summarized on tables and figures accordingly to provide more meaningful information regarding each of the research questions.

Description of Sample

The sample included children and adolescents from two separate primary care clinics. Both clinics were comparable in terms of number of patients, population served, and number of pediatricians and nurse practitioners employed. Clinic A employs three pediatricians and one nurse practitioner and provides health care services to approximately 7,000 children age two weeks to nineteen years of age, of which 3,200 are between the ages of 6-19 years. Clinic B employs two physicians and four nurse

practitioners and provides health care services to approximately 7,500 children age two weeks to nineteen years of age of which 3,760 are between the ages of 6-19 years.

A total of 208 medical records were reviewed from the two primary care clinics (102 children and 106 adolescent). Gender was equitable both as a whole as well as within each age group. There were a total of 49 female children and 54 female adolescents for a total of 103 (49.5%) females. There were 53 male children and 52 male adolescents for a total of 105 (50.5%) males.

Table 1.

Description of the sample by age and gender

	Children (n = 102)		Adolescents (n = 106)	
Gender	n	%	n	%
Male	49	23.5	54	26.0
Female	53	25.5	52	25.0

Of the 208 medical records reviewed, the frequency distribution of child and adolescent age groups and gender were evenly represented. The mean age of the entire sample was 11.77 (SD +/- 3.26). However, the most frequently recorded subjects were the 8-year-olds (n = 24). The least frequently recorded subjects were the 18-year-olds (n = 3). The average weight measurement for the entire sample was 47.3 kg or 104 lb (SD +/- 19.23 kg or 42.31 lb). The weight range for all subjects was 18.07 - 101.36 kg or 39.8 - 223 lb. In terms of height, the average for the sample was 148.6 cm or 58.5 in. (SD +/- 18.25 cm or 7.19 in.). The range for BMI spanned from 13.9 - 45.7 for the entire sample. The average BMI was calculated at 20.7 (SD +/- 5.36). The most frequently recorded percentile of weight-for-age of the sample was in the 80th percentile (n = 32). Whereas, the most frequently recorded percentiles of height-for age were in the 50th percentile (n = 25).

Research Question #1: What is the incidence of children and adolescents who are at-risk of overweight or overweight in the outpatient primary care clinic?

The researcher calculated the BMI-for-age of each individual using the most current weight for height recorded in the medical record and the formula, weight (kg)/height (cm)² x 10,000. Of the 208 medical records reviewed, 25.5% (n = 53) of the sample was either at-risk of overweight or overweight. Of these, 19 were identified as at-risk of overweight and 34 were overweight. Therefore, in terms of age groups, 23.5% of children and 27.3% of adolescents were correctly identified by the researcher as having a BMI-for-age as at-risk of overweight or overweight. The incidence of children and adolescents at-risk of overweight and overweight is summarized and reported by age group in Table 2.

Table 2.

Children and adolescents identified with BMI-for-age as at-risk of overweight or overweight by age group

	Children (n = 102)		Adolescents (n = 106)	
	n	%	n	%
BMI-for age < 85%	78	76.5	77	72.7
BMI-for-age > 85% - < 95% (at-risk of overweight)	9	8.8	10	9.4
BMI-for-age > 95% (overweight)	15	14.7	19	17.9

Research Question #2: What is the incidence of children and adolescents identified by the health care professional as at-risk of overweight or overweight in the outpatient primary care clinic?

The frequency of children and adolescents that were either at-risk of overweight or overweight and identified by the health care professional as evidenced by a diagnosis or documentation of an ICD-9-CM code in the medical record was calculated from the total

number identified as being at-risk of overweight or overweight. Data analysis indicated that no individuals at-risk of overweight ($n = 19$) were identified by the health care professional as at-risk of overweight or overweight. A total of 34 subjects were overweight and of those, six children (40%) and eight adolescents (42%) were identified by the health care professional as overweight as evidenced by an ICD 9-CM code for obesity or abnormal weight gain. Therefore, of the 53 subjects determined to be at-risk of overweight or overweight, HCPs only identified 26% ($n = 14$) with an ICD 9-CM code for obesity or abnormal weight gain; no subjects were identified in the medical record as being at-risk of overweight.

Research Question #3: What is the incidence of health care professional office visit interventions for those children and adolescents at-risk of overweight or overweight in the outpatient primary care clinic?

The frequency of the 53 children and adolescents at-risk of overweight or overweight receiving some form of intervention via education on diet and exercise, pamphlets provided, or analysis of 24-hour dietary recall during the office visit was taken from the medical records. Of the 19 with a BMI-for-age as at-risk of overweight, no children and only two of the adolescents received intervention in the form of nutritional education by the HCP during their office visit. Although not statistically significant, children and adolescents with a BMI-for-age as overweight ($n = 34$), adolescents ($n = 12$, 63.2%) were more likely than children ($n = 5$, 33.3%) to receive some form of intervention at the primary care level by the HCP (Pearson Chi Square = 4.3, 1 df, $p = 0.038$).

The most prevalent form of intervention was counseling on nutrition and physical activity by the HCP. Some individuals may have received more than one intervention, but this was not reflected in the percentages. There was no documentation on the medical records of interventions using educational pamphlets on diet and exercise, videos on diet and exercise, or analysis of 24-hour diet recall as strategies for at-risk of overweight or overweight. One child (male, 7.75 years, BMI 34.06) identified as overweight received an intervention of portion control and a weight check in two months. Three in the overweight adolescent group received interventions. Of these, two received lipid profile evaluations (male, 13.33 years, BMI 29.97; and female, 15.83 years, BMI 30.40) and one received blood pressure rechecks (male, 15.5 years, BMI 27.61). HCPs only documented interventions with an ICD 9-CM diagnostic code for obesity or abnormal weight gain. While 53 individuals fit the criteria for the CDC (2003a & c) definition for at-risk of overweight or overweight, only 26% of those ($n = 14$) had an ICD 9-CM code for obesity or abnormal weight gain on the medical record, and only those with a BMI $\geq 95^{\text{th}}$ percentile were recognized by the HCP. The 14 diagnosed with obesity or abnormal weight gain on the medical record represent only 41% of the 34 children and adolescents with a BMI-for-age $\geq 95^{\text{th}}$ percentile. Data regarding interventions for at-risk of overweight and overweight are described in Table 3.

Table 3.

Children and adolescents identified as at-risk of overweight or overweight receiving an intervention

	Total (n = 19)	BMI ≤ 85 < 95% (n = 2)	BMI ≥ 95% (n = 17)
Interventions			
Nutrition education	6	2	4
Nutrition and physical activity	6	0	6
Nutrition and lipid levels	1	0	1
Increase physical activity	2	0	2
Lipid level	1	0	1
Lipid, nutrition and physical activity	1	0	1
Portion control, weight check and physical activity	1	0	1
Blood pressure evaluation	1	0	1

Research Question #4: What is the incidence of referrals to community physical activity programs, or nutrition, psychological or specialty care counseling of those children and adolescents at-risk of overweight or overweight?

The frequency of children and adolescents referred to community physical activity programs, or nutrition, psychological or specialty care counseling from those who were identified as at-risk of overweight or overweight was evaluated. None of the 19 subjects found to be at-risk of overweight was given a referral. Of the 34 individuals identified as overweight, there were three referrals given: two children (13.3%) were referred for nutritional counseling; and one adolescent (5.3%) was referred to a community physical activity program and a community nutritional program such as Weight Watchers. No referrals were made to specialists in the fields of psychology or endocrinology. Only subjects with a HCP determined ICD 9-CM diagnostic code for obesity or abnormal weight gain were referred.

Research Question #5: What is the incidence of children and adolescents at-risk of overweight and overweight with a chronic medical condition who were referred to

community physical activity programs, or nutrition, psychological or specialty care counseling?

The incidence of children and adolescents at-risk of overweight and overweight with chronic medical conditions who were referred to community physical activity programs, or nutrition, psychological or specialty care counseling was calculated from the 53 individuals within the sample who were calculated to be at-risk of overweight and overweight. Twenty-three of the 53 children and adolescents were identified with chronic medical conditions. These chronic medical conditions were asthma/reactive airway disease (RAD) (n = 9), attention deficit hyperactivity disorder/attention deficit disorder (ADHD/ADD) (n = 6), depression (n = 2), musculoskeletal disorders, which included scoliosis (n = 2), mental retardation and autism (n = 1), developmental delay (n = 1), constipation (n = 1), and seasonal allergies (n = 1). The adolescent diagnosed with scoliosis also had a history of hypertension. These chronic medical conditions do not intrinsically alter the weight or energy metabolism of an individual. However, they can affect a person's activity tolerance or physical capability, which can in turn alter the individual's energy metabolism and weight. There were two referrals generated to nutritional medicine. Both children (male, 6.33 years and female, 9.67 years) were identified by the HCP as overweight with a chronic medical condition of RAD. Table 4 depicts the incidence of chronic medical conditions identified in the review of records as it relates to the incidence of at-risk for overweight or overweight.

Table 4.

Subjects identified as at-risk of overweight or overweight with a chronic medical condition by age group

	Children (n = 11)		Adolescents (n = 12)	
	n	%	n	%
Individuals with BMI for-age $\geq 85\%$ - $< 95\%$ with a chronic medical condition				
RAD	1	4.2%	0	0%
ADHD/ADD	1	4.2%	0	0%
Depression	0	0%	1	3.4%
Musculoskeletal/Scoliosis	1	4.2%	0	0%
Individuals with BMI-for-age $\geq 95\%$ with a chronic medical condition				
RAD	5	20.8%	3	10.3%
ADHD/ADD	1	4.2%	4	13.8%
Depression	0	0%	1	3.4%
Musculoskeletal/Scoliosis and hypertension	0	0%	1	3.4%
Other:				
Developmental Delay	1	4.2%	0	0%
Mental Retardation/Autism	0	0%	1	3.4%
Constipation	1	4.2%	0	0%
Seasonal Allergies	0	0%	1	3.4%

Research Question #6: What is the difference between the referral rate of those children and adolescents with an existing chronic medical condition who were at-risk of overweight or overweight and the referral rate of those at-risk of overweight or overweight without an existing chronic medical condition in the outpatient primary care clinic?

A multi-level Chi-squared test of independence was used to determine whether the referral rate of children and adolescents who were at-risk of overweight or overweight with a chronic medical condition differs from the referral rate of children at-risk of overweight or overweight without a chronic medical condition. The Chi-square value was calculated as 2.579 with 1 degree of freedom. The significance was established using for the Fisher Exact Test because the total number of referrals was less than five. Data analysis indicated that the differences between referrals generated for those at-risk

of overweight or overweight with chronic medical conditions and those at-risk of overweight or overweight without chronic medical conditions was not significant ($p = 0.199$). The records review indicated that only two subjects with a chronic medical condition received a referral. One child (male) was 6.33 years of age and had a BMI of 26.23. The other child (female) was 9.67 years of age and had a BMI of 29.15. Both of these children had a diagnosis of RAD and both were given a referral for nutritional counseling. One adolescent (13.25 years, female, BMI = 45.65) without a chronic medical condition received two referrals, per her request, to community organizations for overweight: one referral was to a community physical activity program and the other was to Weight Watchers. No subjects, with or without chronic medical conditions, received referrals for specialty care or psychological counseling. None of the 13 children and adolescents at-risk of overweight with a chronic medical condition was given a referral. Furthermore, 17 of the 19 (89.5%) children and adolescents overweight with a chronic medical condition did not receive any type of referral.

Summary

The analysis of data for each research question was presented. The purpose of this study was to determine the incidence of missed opportunities for identifying, managing and referring at-risk of overweight and overweight children and adolescents for nutritional, psychological or other forms of counseling in two separate, midwestern, suburban outpatient primary care clinics.

Data indicate that only 10.5% ($n = 2$) of the 19 subjects identified as at-risk of overweight and 50% ($n = 17$) of the 34 subjects identified as overweight are receiving some form of intervention. None of the subjects ($n = 19$) at-risk of overweight were

given a referral. Of the 34 subjects who were overweight, three were given referrals (8.8%). Of the 32 subjects at-risk of overweight or overweight with a chronic medical condition, only 6.3% ($n = 2$) were referred for some form of specialty care. Only three individuals, two children with a chronic medical condition and one adolescent without a chronic medical condition, received a referral (5.7%). None of the adolescents with chronic medical conditions were referred for specialty care counseling. The limitations and implications of the study as well as recommendations for health care professionals in the primary care setting are discussed in Chapter V.

V. SUMMARY

The issue of obesity in the nation has been a concern for several decades (Office of the Surgeon General [SG], 2001). Researchers have reported survey findings regarding the identification, management and referral practices of at-risk of overweight and overweight children and adolescents but none have performed a retrospective medical record review to explore these practices (Barlow & Dietz, 2002; Jonides, Buschbacher & Barlow, 2002). Therefore the objective of this study was to evaluate the practices of health care providers in the primary care setting with regards to identifying, managing and referring at-risk of overweight and overweight children and adolescents. The researcher addressed six research questions within the context of this study. Chapter V concludes this study with a discussion of findings and limitations, implications for nursing practice, education and administration, and recommendations for further research.

Conclusions and Discussion of Findings

Researchers report that children and adolescents who are either at-risk of overweight or overweight are more likely to have health-related consequences that include both physical and psychological problems (Barlow & Dietz, 1998). In this study it was found that HCPs are not routinely identifying, managing, treating or referring this population for either nutritional or psychological counseling, nor are they referring this population for specialty care or community physical activity programs. Based on the recommendations of the CDC (2003c) and Healthy People 2010 (2000) and as evidenced

by these findings, more adequate and consistent assessment of overweight is needed to improve the identification process.

The first question addressed the incidence of at-risk of overweight and overweight in the sample. Of the 208 medical records reviewed for this study, the prevalence rate of children and adolescents who were overweight (BMI-for-age $\geq 95^{\text{th}}$ percentile) was found to be 14.7% and 17.9% (95% CI), respectively. The latest reports from NHANES 1999-2000 shows the prevalence of overweight children as 15.3%, and among adolescents as 15.5% (Ogden, Flegal, Carroll, & Johnson, 2002). The findings of this study are comparable to those found at the national level. The incidence of at-risk of overweight (BMI-for-age $\geq 85^{\text{th}}$ percentile to $< 95^{\text{th}}$ percentile) was approximately 9% for both age groups. The NHANES 1999-2000 report combines the rate of at-risk of overweight and overweight (approximately 30% for both age groups) rather than listing at-risk of overweight separately. Therefore, a comparative analysis could not be done. Furthermore, no other studies have reported on the rate of at-risk of overweight, so additional comparisons could not be accomplished.

The second research question was designed to determine the incidence of children and adolescents identified by the HCP as at-risk of overweight or overweight in an outpatient primary care setting. Of the 208 medical records reviewed, none of the 19 at-risk of overweight children and adolescents was identified as being at-risk of overweight by the HCP. Although all individuals had their height and weight plotted on the growth charts in the medical record, there was no documentation during the clinic visit mentioning the BMI or that the individual was at-risk of overweight. Currently there is

not a diagnosis or ICD 9-CM code for at-risk of overweight, but there are diagnoses for obesity and abnormal weight gain.

Thirty-four of the 208 (16.3%) subjects were determined to be overweight through calculation of weight [(kg)/height (m^2)] by the researcher. Of these, 6 children and 8 adolescents were identified by the HCP as overweight as indicated by an ICD 9-CM code of obesity or abnormal weight gain on the medical record. The fact that nearly 60% ($n = 20$) of the 34 children/adolescents with BMI-for-age $\geq 95^{th}$ percentile indicating overweight were not identified by their HCP as overweight is potentially problematic. As researchers in the Bogalusa Heart Study reported, children as young as eight-years-old had documented changes in heart function that later led to coronary artery disease in adulthood (Freedman et al., 2001). Heart disease is the leading cause of death in America with an attributed death rate of one million annually from all major acquired cardiovascular disorders (CDC, 2003c). Children who were obese at 13 years of age showed a significant increased risk of obesity as adults (Wright, Parker, Lamont, & Craft, 2001). Females with a BMI greater than the 85th percentile have a two-fold increased rate of early menarche, and researchers have shown that early menarche increases a woman's risk of breast cancer (McCance & Huether, 2002). Breast cancer kills approximately 45,000 women annually and is the leading cause of death in women age 40-44 years. Lastly, children and adolescents perceive the most immediate consequence of overweight to be social discrimination, which is associated with poor self-esteem and depression (SG, 2001). All are compelling reasons for HCPs to increase their awareness and preventive care of children and adolescents who are at-risk of overweight or who are already overweight.

The third research question examined the incidence of HCP primary care office visit interventions for children and adolescents at-risk of overweight or overweight. None of the nine children found to be at-risk of overweight was given any form of intervention related to their BMI. Under anticipatory guidance, nutrition was noted on the medical record as being discussed. However, none of the documentation related the discussion of nutrition to the individual's BMI, nor was the BMI documented on the patient-clinic encounter form. The height and weights were recorded on the growth charts and on the patient-clinic encounter form, but there was no documentation relating the growth of the individual to the BMI-for-age. Therefore, it is not known whether the anticipatory guidance of nutrition was done because of the at-risk of overweight status or if it was provided as general anticipatory guidance. In the adolescent group, 2 of the 10 (20%) adolescents found to be at-risk of overweight received some form of intervention, such as portion control or nutrition counseling involving the food guide pyramid. These interventions were clearly associated with the individual's BMI as indicated on the patient-clinic encounter form. Of the 34 subjects with a BMI-for-age as overweight, significantly more adolescents ($n=12$, 63.2%) than children ($n=5$, 33.2%) received some form of intervention at the primary care level by the HCP ($\chi^2 = 4.3$, $df = 1$, $p = 0.038$). Therefore, adolescents were more likely than children to receive an intervention at the primary care level, whether at-risk of overweight or overweight. This is rather puzzling since researchers have reported that interventions with children are often more successful because parents still maintain control over the child's eating habits and because the entire family is involved in treatment (Barlow & Dietz, 1998; Epstein, et al., 2000).

Overweight children (n = 5, 33%) and adolescents (n = 12, 63%) were more likely to have an intervention than those at-risk of overweight. The majority of interventions included nutrition and physical activity counseling. There were four individuals from both age groups who received other forms interventions. These other forms of intervention included portion control and lipid panel studies. All of these interventions are consistent with the Expert Committee guidelines for the evaluation and possible treatment of overweight (Barlow & Dietz, 1998). In fact, the Expert Committee recommends an emphasis on increasing activity level and decreasing caloric intake as the mainstay of a weight reduction program, which will allow the child to grow into their weight.

The next research question was designed to examine the incidence of referrals for children and adolescents at-risk of overweight or overweight in the primary care setting to community physical activity programs, nutrition, psychological or specialty care counseling. Other than routine nutritional counseling at the primary care level, none of the children or adolescents at-risk of overweight was given a referral for specialty care or counseling. Although these individuals were not identified as at-risk of overweight by the HCP to begin with, it may be important to note that most medical insurance does not cover preventive care in this area. Most insurance policies pay for office visits that are listed under a diagnosis in the ICD 9-CM book. Although preventive health exam is listed in the book, at-risk of overweight is not because it does not exist as a clinical diagnosis. Therefore, referring children and adolescents out for specialty care or counseling may not be covered by the family's insurance policy, and the cost for such care would be the responsibility of the family.

Of the 15 children and 19 adolescents identified by the HCPs as being overweight, only three were referred for nutritional counseling, a community physical activity program or a weight loss program such as Weight Watchers. This equated to a referral rate of about eight percent for both groups combined (13.3 % for children and 5.3% for adolescents). Therefore, 91.2% of those who were overweight ($n = 31$) were not referred to community physical activity programs, nutritional, psychological or specialty care counseling. According to the Expert Committee on Pediatric Obesity, recommendations indicate that children and adolescents with a BMI greater than or equal to the 95th percentile, with or without complications, must undergo evaluation and possible treatment (Barlow & Dietz, 1998). The researcher's findings for referral rate were lower than those found by Jonides, Buschbacher and Barlow (2002). In their survey study of pediatricians, RDs and PNPs, a small percentage was said to have routinely referred overweight patients to either behavior modification programs (12%-24%), family therapy (8%-15%) or to group therapy (5%-10%). The problem encountered in trying to compare findings with those found in the literature involves the lack of explicit documentation in the medical record as to the HCP reason for not referring these patients. It might be that the individual was not ready for change, or the family lacked readiness to change. Perhaps the individual or family member refused the referral for specialty care or the referral was not generated because the patient did not meet specific criteria. Unfortunately, because there was no specific documentation with regards to this issue, one cannot determine the reason for lack of follow through on the HCPs part.

Research question five was designed to assess the incidence of referring children and adolescents at-risk of overweight or overweight with a chronic medical condition to

community physical activity programs, or nutrition, psychological or specialty care counseling. Again, neither children ($n = 3$) nor adolescents ($n = 1$) at-risk of overweight received referrals even though a chronic medical condition existed. According to the Expert Committee, children who present with complications of overweight should be referred to pediatric obesity treatment centers (Barlow & Dietz, 1998). Although there are few such centers available, the Weight-control Information Network (WIN) can assist clinicians in identification of pediatric weight-control services in their area. The chronic medical conditions found in these individuals consisted of asthma, attention deficit disorder (ADD), musculoskeletal disorders such as scoliosis, and depression, all of which can be exacerbated in the presence of overweight either by poor physical endurance, low self-esteem or both (Barlow & Dietz, 1998). Therefore, preventing and/or treating overweight in this particular population is extremely important for optimizing care and preventing unnecessary emergency room visits and hospital admissions.

There were a total of 19 children and adolescents who were overweight with chronic medical conditions. Of these, only two children with RAD received referrals for nutritional counseling for a referral rate of 13.3% which is comparable to that mentioned previously by Jonides, Buschbacher and Barlow (2002) whose average referral rate was approximately 12.5 %. However, a referral rate this low is rather alarming. A possible explanation for this low referral rate might be related to the barriers experienced by HCPs in the current health care milieu. Lack of motivation and self-efficacy on the individual's part, little time available for the HCP to counsel and educate the patient on their health care options, lack of access to tertiary care providers for severe cases of obesity, and lack of reimbursement by insurance companies are all potential reasons for individuals not

being referred appropriately. However, as obesity-related health conditions continue to rise and become chronic, HCPs will undoubtedly encounter problems such as obstructed sleep apnea, type 2 diabetes, dyslipidemia and glucose intolerance warranting access to subspecialists (Barlow & Dietz, 2002).

Due to the small numbers in the sample, the researcher was unable to determine a significance in the difference between the referral rate of those children and adolescents with an existing chronic medical condition and at-risk of overweight or overweight and the referral rate of those at-risk of overweight or overweight without an existing chronic medical condition.

In the at-risk of overweight category, of the thirteen individuals (children $n = 3$ and adolescents $n = 10$) with a chronic medical condition, and the 15 individuals (children $n = 6$ and adolescents $n = 9$) without a chronic medical condition, none was given a referral for community physical education programs, nutritional or psychological counseling or for specialty care. There were a total of 34 individuals who were overweight. Nineteen of the 34 individuals (55.9%) also had a chronic medical condition. Of the 19 individuals with a chronic medical condition and overweight, two children with asthma received nutritional referrals (10.5%). Of the individuals who were overweight without a chronic medical condition ($n = 15$), one adolescent (6.7%) received two referrals (one for a community physical activity program and one for Weight Watchers International).

There are researchers who recommend that all children with abnormal weight and normal height undergo dietary management (Leglar & Rose, 1998). Others recommend an in-depth assessment to determine if the individual is at an increased risk for health

complications (Committee on Practice and Ambulatory Medicine [CPAM], 2003). The Expert Committee recommends that any child with or without a chronic medical condition who has complications of obesity be referred for treatment (Barlow & Dietz, 1998). Evidence from experimental and longitudinal cohort studies shows that overweight children are likely to suffer from psychological and psychosocial problems that persist into adulthood (Edmunds, Waters & Elliot, 2001). Persistent obesity in childhood is also associated with other lifestyle related diseases in adulthood that include cardiovascular disease, Type 2 diabetes, osteoarthritis, breast and alimentary cancers, asthma and other respiratory illnesses and aggravation of rheumatic disorders. Therefore, these chronic medical conditions could complicate the individual's overweight and thus necessitate a referral. Perhaps the reason for the low referral rate in this study is related to the lack of available treatment centers for children and adolescents who are overweight. However, despite such barriers faced by families and HCPs, one of the primary national healthcare goals is the maintenance of a healthy weight in adults and children in the effort to reduce the burden of illness and its consequent reduction to the quality of life and life expectancy (HP 2010, 2000). This can only be done through appropriate identification, aggressive management and referral as needed.

Limitations

The findings in this research study are limited based on several considerations. First of all, this study was a descriptive study and therefore no causal relationship between study variables should be assumed. Secondly, identified or unidentified extraneous and intrinsic variables within the clinic setting may have affected the findings of the study. Third, because the data collection tool used for this study was newly

developed, its reliability and validity measurements have not been tested using factor analysis tests. Fourth, it was noted during the record reviews that nutrition was discussed under the heading of anticipatory guidance at nearly every visit. However, it could not be determined if the information provided to the individual was general or specific to the weight issue because the patient-encounter forms were in a check-list format rather than narrative. Fifth, it is not known whether subjects were correctly measured in the medical record resulting in the database for calculating at-risk of overweight or overweight. The researcher calculated the BMI-for-age for all 208 medical records reviewed. Those who were at-risk of overweight or overweight were further reviewed for the additional criteria. If the individual was not at-risk of overweight or overweight based upon their BMI-for-age, then no further information was obtained. Therefore, it is unknown if any of these subjects had a previous history of overweight, received any form of intervention or were referred for specialty care because only the most recent recorded height and weight documented in the medical record was used to calculate the BMI-for-age. It is also unknown if subjects were identified as at-risk of overweight or overweight by the HCP based on the criteria other than BMI-for-age. In other words, HCPs may have been providing weight related interventions that were based on criteria other than BMI-for-age. An additional limitation is the lack of documentation regarding the family or client response to the suggestion of a referral on the medical record. The low referral rate by the HCPs may be attributed to the family member or client refusing the referral. However, the HCP did not document the response on the medical record. A further limitation was that documentation by the HCP might not tell all that occurred during the patient encounter. There might have been extensive information given about diet and

exercise but not documented accurately in the medical record. Another limitation was that the list of chronic medical conditions was not refined as to the severity of the illness or the necessity for intervention. An individual may have been overweight but had their asthma under control. A control group comparing the referral and intervention rate among normal weight children and adolescents with chronic medical conditions to those at-risk of overweight and overweight would have increased the strength of the study. Lastly, the sample was drawn from a convenience sample of participating sites, thus the findings from this study are not generalizable to other populations.

Implications for Nursing Practice

The number of children and adolescents identified as either at-risk of overweight or overweight in the U.S. has risen dramatically in the past two decades. It is a condition that is preventable, but largely under-diagnosed and under-treated as this study shows. Approximately 92% of all children and adolescents who are at-risk of overweight were not identified as such nor did they undergo any treatment. The national healthcare goals for childhood obesity are clearly listed in HP 2010 (2000). They are to reduce the number of children and adolescents who are overweight or obese, increase the proportion of fruits and vegetables and decrease the proportion of saturated fat eaten by everyone over the age of 2 years, and provide education on diet and nutrition to a greater proportion of individuals who visit physician offices who also have a diagnosis of cardiovascular disease, diabetes or hyperlipidemia. It is absolutely essential for HCPs to discuss prevention of overweight at every well-child visit by encouraging healthy nutrition, decreasing sedentary behaviors and increasing physical activity. Treatment should be initiated when the child's BMI reaches the 85th percentile on the BMI-for-age

growth chart. This will increase the person's ability to prevent becoming overweight or assist in maintaining current weight until the individual is able to grow into it.

A retrospective cohort study was conducted by researchers on the risk of obesity in young adulthood and its association with both obesity in childhood and obesity in one or both parents (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Researchers found that before age three, the primary predictor of obesity in adulthood was the parents' obesity status and not the child's. From age three through nine years both the child and parents' obesity status were important indicators. However, after age nine years, the child's obesity status was the most important indicator of whether they would become obese adults. Important evidence to support the idea that intervening at a young age, when children are flexible and parents still have the opportunity to influence their children's diet and activity level positively, can play a key role in preventing obesity in adulthood.

HCPs who work with children must become more diligent at screening for and documenting overweight in the pediatric population. The use of the BMI-for-age growth charts in every medical record can assist HCPs to assess this issue at every well child visit. Once a child or adolescent is identified as at-risk of overweight or overweight, a thorough health assessment should be performed to include a medical and family history, dietary assessment to evaluate eating practices, quality and quantity of foods, an evaluation of daily physical activity levels, and a physical examination (Barlow & Dietz, 1998). Laboratory testing and psychological evaluation can be done as needed based upon the degree of overweight, family history and results of the physical exam.

With the high prevalence of overweight and its related health conditions and its negative physical and mental health consequences, the prevention and identification of

overweight should be a major priority for all pediatric HCPs. Because the primary care setting is the optimal venue to emphasize health promotion and illness prevention, HCPs can make a tremendous contribution to the prevention and identification of child and adolescent overweight.

Improved methods for managing and referring those identified as at-risk of overweight and overweight need to be developed for the primary care setting. Informative documentation in the form of a checklist or clinical care guideline can assist HCPs in maintaining a degree of continuity of care. If applied effectively it can be used as documentation for reimbursement purposes.

Nurses have long been advocates of health promotion and illness prevention, and are therefore in an ideal position to implement strategies to prevent obesity (Jerum & Melnyk, 2001). The primary care setting is the optimal place to implement strategies since it is considered the gateway to the health care system. Parents can be taught about healthy nutrition to include limiting fast foods and sugar filled beverages and increasing the availability of fresh fruits and vegetables. Concrete instructions to family members and clients can be given such as:

- limit fast foods to once per week
- avoid soda and other sweetened beverages
- consume beverages without additional caloric sweeteners
- keep fresh fruits and vegetables on serving trays in the refrigerator cleaned and cut as quick snack options for children.

- if snacks such as crackers or chips are offered, allow children to place their serving in a separate container rather than eat from the immediate source so that both the parent and child can keep track of portion sizes and amount consumed.

Successful treatment of obesity requires a multidisciplinary approach (Barlow & Dietz, 1998; AAP, 2003). Because evidence supports the idea that pediatric overweight places children and adolescents at a higher risk of developing multiple physical and psychosocial disorders, it behooves HCPs to take action and begin treatment when the child is at-risk of overweight rather than wait until the child becomes overweight. There are some concerns about the long-term efficacy of current interventions and lack of availability of treatment centers. Barriers to success involve the individual's and family's lack of motivation, cost, time, use of materials and approaches that do not meet the client's needs, lack of reimbursement and lack of follow-through from health care professionals. Third party reimbursement generally does not cover weight loss or community physical activity programs (such as the YMCA or Weight Watcher's International) (Schumann, Nichols & Livingston, 2002). Health club and fitness center memberships may not be a viable financial option for some families and some view preparing nutritious meals with fresh fruits and vegetables as expensive and time consuming. Finally, HCPs are pressured to see more patients in less time, leaving little time to thoroughly educate and motivate their clients to change lifestyle behaviors. Regardless of these barriers, the overall implications for HCPs in the primary care setting are to promote wellness, prevent illness and complications of disease if possible and to refer to a sub specialty as needed for consultation or treatment for a health problem (Forrest et al., 1999).

Implications for Nursing Education

Researchers have provided evidence that school-based interventions aimed at preventing obesity can be successful at preventing obesity. Gimme 5: A Fresh Nutrition Concept for Students initiated by Registered Dietitians was a 4-year school based intervention designed to increase the daily consumption of fruit and vegetables by high school students (O'Neil & Nicklas, 2002). The program was designed using the PRECEDE-PROCEED model to plan effective behavior modification interventions to identify predisposing, enabling and reinforcing factors for the daily consumption of fruit and vegetables. Developing an awareness about nutrition and hands-on activities to practice behaviors were also included. Although weight reduction was not evaluated, the program was successful in increasing student knowledge, awareness and practices toward an increased consumption of fruit and vegetables. Perhaps as a future study, the same model could be used to plan effective behavior modification interventions for weight loss or increasing physical activity of children and adolescents.

At present, the counties where this study took place had no standard education plan for teaching nutrition and obesity prevention within the public school systems. Information about nutrition and obesity prevention is often incorporated into health education courses. Unfortunately, the curriculum for health education is not standardized within the public school system like other course work such as reading, arithmetic and social studies. This practice leads to inconsistency in what is taught as well as what is learned by students. Perhaps the best course of action would be to implement programs within the schools by the school nurse. Nursing education at the collegiate level could incorporate such programs into their curriculum to provide school nurses with the

knowledge and ability to institute programs specifically for nutritional education and obesity prevention. The school nurse is a valuable resource to assist in the development and implementation of such programs.

The other issue of concern gleaned from this study is the lack of identification, management and referral of children and adolescents at-risk of overweight. Currently there are no diagnoses for this problem, which might be why it is not listed in the documentation on the medical record. A major complication in comparing this study's findings with other studies is that there is no evidence that other researchers have looked at the treatment and referral rates for those at-risk of overweight.

Compared to the survey study of pediatricians, PNPs and RDs, this study's treatment rate was extremely low (Jonides, Buschbacher & Barlow, 2002). Other researchers have reported a 50%-61% initiation rate of treatment in overweight children who had no obesity-related medical conditions and 55%-77% adolescent treatment rate without chronic medical conditions. This study's findings were well below that at 33.3% and 63.2% respectively. Evidence in several studies report that early treatment of obesity is the key for a successful outcome (Barlow & Dietz, 1998; Jerum & Melnyk, 2002; Schumann, Nichols and Livingston, 2002). Therefore, targeting nursing education to inform future nurses about the guidelines of identification, management and referral of those at-risk of overweight and overweight is an important step in preventing obesity-related complications.

Recommendations for Research

Recommendations for future research could be accomplished via a cost analysis comparing primary care usage of children and adolescents without chronic medical

conditions to those who are normal weight, at-risk of overweight and overweight without chronic medical conditions. Comparing the three groups might show evidence that as the BMI increases so does probability of obesity-related complications.

According to a study of national health care costs, attributed to both overweight and obesity in adults, medical expenses reached \$78.5 billion dollars in 1998 (Finkelstein, Fiebelkorn, & Wang, 2004). Medicare and Medicaid paid approximately half of these expenditures. In Ohio, the total medical expenditures attributed to obesity and overweight in adults were \$3304 million dollars in 1998. A similar research study could be done to assess indirect medical costs as it relates to the value of income lost from decreased productivity and absenteeism by the primary care giver of at-risk overweight and overweight children and adolescents. The findings may give valuable information for state policymakers to decide how best to allocate public health resources and provide data regarding the economic impact of obesity in a state (Finkelstein, Fiebelkorn & Wang, 2004).

The list of chronic medical conditions was obtained from research articles that associated the conditions with overweight, decrease activity tolerance or altered energy metabolism. It might prove beneficial to refine the list of chronic medical conditions as to their severity to reflect whether a need for intervention or referral is warranted.

A further area of future study would be to include a comparison of the referral rate and chronic medical conditions of non-overweight children and adolescents to the referral rate and chronic medical conditions of at-risk of overweight and overweight children and adolescents. By allowing for a control group, the strength of the findings would be increased.

As noted previously, the small sample size of this study contributed to its lack of generalizability to a larger population of children and adolescents. Perhaps if a random selection from all the primary care clinics within a particular county were used there might be a possibility that one would have an adequate sample for generalizing the findings to the region. This type of study could provide evidence to the county and state health department that a standardized screening nutrition requirement and mandatory physical education programs for children and adolescents could assist in raising the awareness of obesity-related health conditions and the behaviors that prevent them.

Others areas which could assist in identifying and managing and referring at-risk of overweight and overweight children and adolescents would be the development of standardized checklists similar to clinical care guidelines which are used in the inpatient setting. These guidelines could be tested for their effectiveness in identifying and managing overweight individuals and provide a core of knowledge regarding the most beneficial treatment practices available.

A simple tool to assist HCPs in identifying children and adolescents at-risk of overweight and overweight in the primary care setting is the BMI-for-age growth chart. By instituting this growth chart in every health record, HCPs can at a glance determine if the individual is at-risk of overweight or overweight. When used at every visit, the chart can be used to show trends in weight gain or loss. Additionally, the chart can be used as a visual aid to show the client, parents and family where the child falls on the BMI curve just as the current height and weight charts do. Furthermore, HCPs can use the chart to approach the family and client to discuss the need for weight gain or loss. This data can be used to generate further research questions.

Research in the area of how to motivate the overweight child would be useful for HCPs. Approximately 70% of Pediatricians, PNPs, and RDs surveyed reported they did not initiate treatment in patients who did not want to control their weight because of lack of appropriate specialists or programs available, lack of reimbursement by insurance companies and because there were no medical complications associated with the obesity (Jonides, Buschbacher & Barlow (2002). Research is needed on how to enlist the interest of the unmotivated and unconcerned families without alienating them. McWhorter, Wallmann, and Alpert (2003) report certain guidelines might be helpful in motivating the overweight child and that evidence about the efficacy of these guidelines may prove valuable:

- avoid comparing the overweight individual's ability with adolescents who are not overweight
- use concrete examples when discussing physical activity and nutritional goals; de-emphasize winning and competition as well as extrinsic rewards
- make exercise fun and begin with low intensity programs first to build the person's confidence.

Finally, research regarding initiating change in the primary care setting might prove valuable. There are models such as the PRECEDE-PROCEED model that implement change through behavior modification interventions (O'Neil & Nicklas, 2002). This theoretical model could be used to identify, enable and reinforce factors for assisting the HCPs to motivate their patients. A tool for promoting and initiating change HCPs might find useful is the clinical guidelines for promoting smoking cessation (US Department of Army, 1999). By modifying the guidelines to fit the overweight patient, the provider can

develop a reasonable office-based approach for establishing the patient's interest in losing weight, the severity of the patient's weight problem, previous weight loss attempts, reasons why they are overweight, and any concerns about losing weight.

APPENDICES

APPENDIX A

Data Collection Spreadsheet and Code Book

A Retrospective Study of the Incidence of Missed Opportunities in Identifying, Managing and Referring Children and Adolescents At Risk of Overweight or
Overweight in Outpatient Primary Care Setting
Data Collection Tool

Item #1	* ID number							
Item #2	Gender							
Item #3	Age at time of measure							
Item #4	Date of most recent visit							
Item #5	Weight measurement taken at most recent visit?							
Item #6	Height measurement taken at most recent visit?							
Item #7	Date of most recent weight and height measurement							
Item #8	Most recent recorded weight measurement in kg							
Item #9	Most recent recorded height measurement in cm							
Item #10	BMI calculated (weight (kg)/ height (m ²) x 10,000							
Item #11	Percentile of wt							
Item #12	Percentile of ht							
Item #13	BMI \geq 85% but < 95%							
Item #14	If BMI \geq 85% is it diagnosed/ documented							
Item #15	Interventions for at-risk of overwt							
Item #16	List documented interventions for at risk for overwt							
Item #17	Referrals documented for at-risk for overwt. List any numbers applicable							
Item #18	Referrals generated: List any numbers applicable							
Item #19	BMI \geq 95%							
Item #20	If BMI \geq 95% is it diagnosed/ documented							
Item #21	Interventions documented for overwt							
Item #22	List documented interventions for overwt							
Item #23	Referrals documented for overwt. List any numbers that apply							
Item #24	Referrals generated: List any numbers that apply							
Item #25	Comorbidities: List any numbers that apply							
Item #26	Health Care Professional Scope of Practice							

*ID Number is an identification number assigned by the principal investigator beginning with 001 and progressing consecutively with each medical record reviewed. It allows the record to be retrieved if errors in data entry are found.

A Retrospective Study of the Incidence of Missed Opportunities in
Identifying, Managing and Referring Children and Adolescents At-Risk of Overweight

And Overweight in an Outpatient Primary Care Setting

Code-book

1. Identification number _____
2. Gender
1 = Male
2 = Female
3. Age in years at time of most recent height and weight measurement

4. Date of most recent visit _____
5. Was weight measurement taken at most recent visit?
1 = Yes
2 = No
6. Was height measurement taken at most recent visit?
1 = Yes
2 = No
7. Date of most recent weight and height measurement _____
8. Most recent recorded weight measurement in kg _____
9. Most recent recorded height measurement in cm _____
10. Present BMI calculated from present weight and height _____
11. What percentile is present weight _____?
12. What percentile is present height _____?
13. Is present BMI-for-age $\geq 85\%$ but $< 95\%$ which is considered **at-risk of overweight**?
1 = Yes
2 = No

14. If present BMI-for-age is $\geq 85\%$ but $< 95\%$, is there a diagnosis or documentation of **at-risk of overweight** in the medical record by the health care professional?
1 = Yes
2 = No
3 = Non applicable
15. Were any interventions documented because individual was diagnosed as **at-risk of overweight** by health care professional such as nutrition or physical activity counseling?
1 = Yes
2 = No
3 = Non applicable
16. Which interventions were documented in the medical record for the diagnosis of **at-risk of overweight**? (Choose all that apply).
1 = Discussion regarding nutrition or food guide pyramid
2 = Discussion regarding increased physical activity (biking, walking, sports, swimming, jogging, dance or aerobics)
3 = Education pamphlets provided regarding diet and exercise
4 = Video reviewed regarding diet and exercise
5 = Analysis of 24-hour diet recall
6 = Other
7 = None
8 = Non applicable
17. Were any referrals generated for the diagnosis of **at-risk of overweight**?
1 = Yes
2 = No
3 = Non applicable
18. Which referrals were generated for the diagnosis of **at-risk of overweight**? (Choose all that apply)
1 = Nutritional referral
2 = Psychological referral
3 = Endocrine referral
4 = Community physical activity programs (YMCA, YWCA)
5 = Other _____
6 = Non applicable
7 = None
19. Is current BMI-for-age $\geq 95\%$ which is considered **overweight**?
1 = Yes
2 = No

20. If present BMI-for-age is $\geq 95\%$, is there a diagnosis or documentation of **overweight** in the medical record by the health care professional?
1 = Yes
2 = No
3 = Non applicable
21. Were any interventions documented for the diagnosis of **overweight** by health care provider such as nutrition or physical activity counseling?
1 = Yes
2 = No
3 = Non applicable
22. Which interventions were documented for the diagnosis of **overweight** in the medical record? (Choose all that apply).
1 = Discussion regarding nutrition or the food guide pyramid
2 = Discussion regarding increased physical activity (biking, walking, sports, swimming, jogging, dance or aerobics)
3 = Education pamphlets provided regarding diet and exercise
4 = Video reviewed regarding diet and exercise
5 = Analysis of 24-hour diet recall
6 = Other
7 = None
8 = Non applicable
23. Were any referrals generated due to **overweight**?
1 = Yes
2 = No
24. Which referrals were generated due to **overweight**? (Choose all that apply)
1 = Nutritional referral
2 = Psychological referral
3 = Endocrine referral
4 = Community physical activity programs (YMCA, YWCA)
5 = Other _____
6 = Non applicable
7 = None

25. If **at-risk of overweight or overweight**, are there any chronic medical conditions?
- 1 = Hypothyroidism
 - 2 = Excess production of cortisol (Cushing's syndrome)
 - 3 = Thalamic or pituitary disorders
 - 4 = Down syndrome
 - 5 = Prader-Willi syndrome
 - 6 = Laurence-Moon syndrome
 - 7 = Obstructed sleep apnea
 - 8 = Type 2 diabetes
 - 9 = Type 1 diabetes
 - 10 = Pregnancy
 - 11 = Depression
 - 12 = Anxiety disorder
 - 13 = Neuromuscular disorders
 - 14 = Musculoskeletal disorders
 - 15 = Cardiovascular insufficiency
 - 16 = Polycystic Ovarian Syndrome
 - 17 = ADHD/ADD
 - 18 = Asthma/RAD
 - 19 = Other _____
 - 20 = None
26. On most recent visit, which health care provider identified the child/adolescent as **at-risk of overweight or overweight**?
- 1 = Pediatrician
 - 2 = Doctor of Osteopathic Medicine
 - 3 = Family Physician
 - 4 = Family Nurse Practitioner
 - 5 = Pediatric Nurse Practitioner
 - 6 = Patient was **at-risk of overweight** but not diagnosed by anyone
 - 7 = Patient was **overweight** but not diagnosed by anyone
 - 8 = Other _____
 - 9 = Non applicable

APPENDIX B

Wright State University Institutional Review Board Approval



Office of Research and Sponsored Programs
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DATE: October 16, 2003

TO: Amy S. Quirke, P.I., Student
College of Nursing & Health
Susan Praeger, Ed.D., CS, Ph.D., Fac. Adv.
College of Nursing & Health

FROM: Robyn James, Programs Facilitator
Secretary to the WSU Institutional Review Board

SUBJECT: SC# 2827

'A Retrospective Study Of The Incidence Of Missed Opportunities In Identifying, Managing And Referring At Risk For Overweight And Overweight Children And Adolescents In An Outpatient Primary Care Setting'

This memo is to verify the receipt and acceptance of your response to the conditions placed on the above referenced human subjects protocol/amendment.

These conditions were lifted on: October 16, 2003

This study/amendment now has full approval and you are free to begin the research project. This implies the following:

1. That this approval is for one year from the approval date shown on the Action Form and if it extends beyond this period a request for an extension is required. (Also see expiration date on the Action Form)
2. That a progress report must be submitted before an extension of the approved one-year period can be granted.
3. That any change in the protocol must be approved by the IRB; otherwise approval is terminated.

If you have any questions concerning the condition(s), please contact me at 775-2425.

Thank you!

/rdj

Enclosure

REFERENCES

- American Academy of Pediatrics, Committee on Nutrition (2003). Prevention of pediatric overweight and obesity. *Pediatrics*, 112, 424-429.
- Barlow, S., & Dietz, W. (1998). Obesity evaluation and treatment: Expert committee recommendations [Electronic version], *Pediatrics*, 102, e29.
- Barlow, S., & Dietz, W. (2002). Management of child and adolescent obesity: Summary and recommendations based on reports from pediatricians, pediatric nurse practitioners, and registered dietiticians. *Pediatrics*, 110(Suppl. 1), 236-238.
- Behrman, R., Kliegman, R., & Jenson, H. (2004). *Nelson Textbook of Pediatrics* (17th ed). Philadelphia: Saunders.
- Bouchard, C. (2000). The obesity epidemic. *Physical Activity and Obesity* (pp. 3-19). Champaign: Human Kinetics Publishers.
- Burns N., & Grove, S. (2001). *The Practice of Nursing Research: Conduct, Critique & Utilization* (4th ed). Philadelphia: W.B. Saunders.
- Centers for Disease Control (2003a). *BMI-for-Age*. Retrieved 5/30/2003 from Centers for Disease Control and Prevention, National Center for Chronic Disease and Health Promotion <http://www.cdc.gov.nccdphp/dnpa/bmi/bmi-for-age.htm>.
- Centers for Disease Control (2003b). *BMI for Children and Teens: Overweight and Obesity*. Retrieved 5/30/2003 from Centers for Disease Control and Prevention, National Center for Chronic Disease and Health Promotion <http://www.cdc.gov.nccdphp/dnpa/obesity/index/htm>

- Centers for Disease Control (2003c). *Overweight Children and Adolescents: Recommendations to Screen, Assess and Manage*. Retrieved 5/30/2003 from Centers for Disease Control and Prevention, National Center for Chronic Disease and Health Promotion <http://www.cdc.gov.nccdphp/dnpa/growthcharts/training/modules3/text/intro/htm>.
- Chen, W., Srinivasan, S., Bao, W., & Berenson, G. (2001). The magnitude of familial associations of cardiovascular risk factor variables between parents and offspring are influenced by age: The Bogalusa heart study. *Annals of Epidemiology*, 11, 522-528.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2nd ed)*. New York: Academic Press.
- Committee on Practice and Ambulatory Medicine (2003). *Recommendations for Preventive Pediatric Health Care*. Retrieved August 29, 2003 from <http://www.aap.org/policy/periodicity.pdf>
- Dietz, W. (1994). Critical periods in childhood for the development of obesity. *American Journal of Pediatrics*, 103, 676-686.
- Ebbeling, C. Pawlak, D. & Ludwig, D. (2002). Childhood obesity: Public-health crisis, common sense cure. *Lancet*, 360, 473-482.
- Edmunds, L., Waters, E., & Elliott, E., (2001). Evidence based management of childhood obesity. *British Medical Journal*, 323, 716-720.
- Epstein, L., Paluch, R., Gordy, Constance C. & Dorn, J. (2000). Decreasing sedentary behaviors in treating pediatric obesity. *Archives of Pediatrics and Adolescent Medicine*, 154, 220-226.

- Epstein, L., Valoski, A. Wing, R., & McCurley, J. (1994). Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology, 13*, 373-383.
- Erikson, E. (1963). *Childhood and Society (2nd ed)*. New York: W.W. Norton and Company.
- Finkelstein, E., Fiebelkorn, I., Wang, G. (2004). State-level estimates of annual medical expenditures attributable to obesity. *Obesity Research, 12*, 18-24.
- Forrest, C., Glade, G., Baker, A., Bocian, A., Kang, M., & Starfield, B., (1999). The pediatric primary-specialty care interface. *Archives of Pediatric and Adolescent Medicine, 153*, 705-714.
- Foster, R., Hunsberger, M., & Anderson, J., (1989). *Family-centered Nursing Care of Children*. Philadelphia: W.B. Saunders Company.
- Frankenburg, W. (1974). Selection of diseases and tests in pediatric screening. *Pediatrics, 54*, 612-616.
- Freedman, D., Khan, L., Dietz, W., Srinivasan, S., & Berenson, G. (2001). Relationship of childhood obesity to coronary heart disease risk factors in adulthood: The Bogalusa heart study. *Pediatrics, 108*, 712-718.
- Gonzales, E., Marshall, J., Heimendinger, J., Crane, L., & Neal, W. (2002). Home and eating environments are associated with saturated fat intake in children in rural West Virginia. *Journal of the American Dietetic Association, 102*, 659-664.
- Green, C., Singleton, J., & Aronzon, D. (2001). *Primary Care Pediatrics*. Philadelphia: Lippincott Williams & Wilkins.

- Gulliaume, M. (1999). Defining obesity in childhood: Current practice. *American Journal of Clinical Nutrition*, 70 (Suppl), 126-130.
- Gunnell, D., Frankel, S., Nanchahal, K., Peters, T., & Smith, G. (1998). Childhood obesity and adult cardiovascular mortality: a 57-y follow-up study based on the Boyd Orr cohort. *American Journal of Clinical Nutrition*, 67, 1111-1118.
- Harkness, G. (1995). *Epidemiology in Nursing Practice*. St. Louis: Mosby, Inc.
- Hart, A. & Hopkins, C. (Eds.). (2003). *International Classification of Disease, 9th Revision, Clinical Modification, Volumes 1, 2, & 3 (6th ed.)*. St. Louis: St. Anthony Publishers
- Jerum, A. & Melnyk, B. (2001). Effectiveness of interventions to prevent obesity and obesity-related complications in children and adolescents. *Pediatric Nursing*, 27, 606-611.
- Johnson, B. (1989). *Adaptation and Growth: Psychiatric-mental Health Nursing (2nd ed)*. Philadelphia: J.B. Lippincott Company.
- Jonides, L., Buschbacher, V., Barlow, S. (2002). Management of child and adolescent obesity: Psychological, emotional and behavioral assessment. *Pediatrics*, 110 (Suppl), 215-221.
- Kozier, B. & Erb, G. (1987). *Fundamentals of Nursing: Concepts and Procedures (3rd ed)*. Menlo Park, CA: Addison-Wesley Publishing Company.
- Leglar, J. & Rose, L. (1998). Assessment of abnormal growth curves. *American Family Physician*, 1-7. Retrieved 1/16/2003 from <http://www.aafp.org/afp/980700ap/leglar/html>.

- Lemura, L. & Maziekas, M. (2002, March). Factors that alter body fat, body mass, and fat-free mass in pediatric obesity. *Medicine & Science in Sport and Exercise*, 34, 487-496.
- Lessler, K. (1972). Health and educational screening of school-age children—definition and objectives. *American Journal of Public Health*, 62, 191-198.
- Linquist, C., Reynolds, K., & Goran, M. (1999). Sociocultural determinants of physical activity among children. *Preventive Medicine*, 29, 305-312.
- Malina, R., & Katzmarzyk, P. (1999). Validity of the body mass index as an indicator of the risk and presence of overweight in adolescents. *American Journal of Clinical Nutrition*, 70 (Suppl), 131-136.
- Marquis, B. & Huston, C. (2003). *Leadership Roles and Management Functions in Nursing* (4th ed). Philadelphia: Lippincott Williams and Wilkins.
- McCance, K. & Huether, S. (2002). *Pathophysiology: The Biologic Basis for Disease in Adults and Children* (4th ed). St Louis: Mosby, Inc.
- McWhorter, J., Wallmann, H., & Alpert, P. (2003). The obese child: Motivation as a tool for exercise. *Journal of Pediatric Health Care*, 17, 11-17.
- Mei, Z., Strawn, L., Pertrobelli, A., Goulding, A., Goran, M., & Dietz, W. (2002). Validity of body mass index compared with other body-composition screening indexes for the assessment of body fatness in children and adolescents. *American Journal of Clinical Nutrition*, 75, 978-985.
- Metz, D., Linquist, C., Birch, L., Fisher, J., & Goran, M. (2002). Relation between mother's child-feeding practices and children's adiposity. *American Journal of Nutrition*, 75, 581-586.

- Mullins, N. (Ed.). (1986). *Mosby's Medical and Nursing Dictionary (2nd ed)*. St. Louis: The C.V. Mosby Company.
- Myers, S. & Vargas, Z. (2000). Parental perceptions of the preschool obese child. *Pediatric Nursing*, 26, 23-30.
- Office of the Surgeon General. (2001). *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. Retrieved August 29, 2003, from http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_adolescents.htm
- Ogden, C., Flegal, K., Carroll, M., & Johnson, C. (2002). Prevalence and trends in overweight among US children and adolescents 1999-2000. *JAMA*, 288, 1728-1732.
- O'Neil, C., Nicklas, T., (2002). Gimme 5: An innovative, school-based nutrition intervention for high school students. *The American Dietetic Association*, 102 (Suppl), 93-96.
- Salbe, A., Weyer, C., Lindsay, R., Ravussin, E., & Tataranni, A. (2002). Assessing risk factors for obesity between childhood and adolescence: I. Birth weight, childhood adiposity, parental obesity, insulin and leptin. *Pediatrics*, 110, 299-306.
- Schumann, L., Nichols, M., & Livingston, D. (2002). Preventing pediatric obesity: Assessment and management in the primary care setting. *Journal of the American Academy of Nurse Practitioners*, 14, 55-62.
- Siedler, A., Hermann, M., Schmitt, H., & Von Kries, R. (2002). Consequences of delayed measles vaccination in Germany. *Journal of Pediatric Infectious Disease*, 21, 826-830.

- Stein, J. (Ed.). (1980). *The Random House College Dictionary (2nd ed)*. New York: Random House, Inc.
- Tershakovec, A., Kuppler, K., Zemel, B., & Stallings, V. (2002). Age, sex, ethnicity, body composition, and resting energy expenditure of obese African American and white children and adolescents. *American Journal Clinical Nutrition*, 75, 867-871.
- Troiano, R., & Flegal, K. (1998). Overweight children and adolescents: Description, Epidemiology, and demographics. *Pediatrics*, 101, 497-503.
- U.S. Department of Army MEDCOM (1999). *Promote Tobacco Use Cessation in the Primary Care Setting*. Washington, DC: VHA Headquarters.
- U.S. Department of Health and Human Services (2000). *Healthy People 2010: Understanding and Improving Health (2nd ed)*. Boston: Jones and Bartlett Publishers.
- Whitaker, R., Wright, J., Pepe, M., Seidel, K., and Dietz, W. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine*, 337, 869-873.
- World Health Organization (WHO) (1998). Obesity: Preventing and managing the global epidemic. *WHO*. Retrieved February 10, 2003 from <http://who/nut/ncd/98.1>.
- Wright, C., Parker, L., Lamont, D., Craft, A. (2001). Implications of childhood obesity of adult health: Findings from thousand families cohort study. *British Medical Journal*, 323(7324), 1280-1285.

Young, T., Dean, H., Flett, B., & Steiman, P. (2000). Childhood obesity in a population at high risk for type 2 diabetes. *The Journal of Pediatrics*, 136, 365-369.